FLASHES AND PLUGS

ALL THAT GLITTERS . . . Spokane, Wash., came up with a fine example of the Wonders of the Grapevine, recently. A Knight of the Steam Shovel, working in a residential neighborhood, hard beset by the usual questions of the Sandpile Set, devised a new and different explanation for his occupation.

"Whacha doin', Mister?"

"Digging for gold," he said.

The original statement was, at best, a slight exaggeration, but it soon ballooned out of such modest proportions. The kids told mama, who relayed it to the bridge club, from whence it moved downtown, and first thing you know the Better Business Bureau, the stockbrokers and the city officials were getting telephone calls. Not only, it seemed, had gold been found, but shares were for sale, and property owners were to come in for a fifth interest.

An emissary from the City Hall arrived hastily, and stock in the corner lot took an abrupt drop.

"Gold?" gasped the demoted 49-er, "I'm putting in a lawn."

• • •

ROCK-A-BYE BOY. A Milwaukee, Wis., magazine editor recently traveled to Calumet, Mich., to give a talk before some group.

The night of his arrival he left a call with the hotel desk to awaken him at 8 o'clock the next morning.

Came 8 o'clock and the hotel people rang the editor's telephone and pounded on his door but they couldn't get a peep out of the slumbering guest.

They finally called the fire department, put a ladder against his second floor window and sent a bellhop in to shake the man into consciousness.

"I forgot to tell you I sleep sort of soundly," the editor explained.

• • •

MAN OF PROPERTY. The hillbilly was disappointed to learn that the general store was out of his favorite brand of chewing tobacco.

"Be sure to telephone me," he admonished, "soon's you get some in."

"But, Lem," replied the surprised storekeeper, "I thought you don't have no telephone."

"I don't," answered the hillbilly, "but you do."

• • •

WHY, ALAS? A Wisconsin housewife contributes a new one to the "Questions Left Hanging in Mid-Air Department." She had just answered the telephone, the shampoo dripping off her nose.

"Adeline?" the caller asked.

"You have the wrong number," said the housewife with proper dignity.

"Well, why, then, did you answer the telephone?" her caller demanded.

CIRCULATION

Guaranteed circulation of this issue is 10,058, of which 9,568 is paid.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

August 14, 1954

Contents

SPECULATION ON THE FUTURE OF TELEPHONY 17
By Keith S. McHugh

IN THE NATION'S CAPITAL 20
By Francis X. Welch

THE PLANT MAN'S NOTEBOOK 23
By Ray Blain

PLANT MAN'S QUIZ 24
By Ray Blain

CARRIER SYSTEMS—Part 4 26
By Harold B. McKay

COURTS AND COMMISSIONS 30

HELPFUL LITERATURE 48

H. D. FARGO Jr., *President & Advertising Manager*
R. C. RENO, *Vice President & Editor*
H. D. FARGO, *Vice President & Treasurer*
A. J. STULTS, *Secretary & Western Manager*
DAN FARGO, *Managing Editor*
FRANCES E. CRETCHER, *Associate Editor*
RAY BLAIN, *Technical Editor*
FRANCIS X. WELCH, *Washington Editor*
MAYME WORKMAN, *Traffic Editor*
VIVIAN RYDEN, *Circulation Manager*

WESTERN REPRESENTATIVES:
McDonald-Thompson, San Francisco, Cal. Also offices in Los Angeles; Seattle, Wash.; Houston, Tex., and Denver, Colo.

Published by
TELEPHONY PUBLISHING CORP.

Vol. 147, No. 7. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn St., Chicago (5), Ill. 20 cents per copy (except special issues). Subscription $3.50 per year U. S.; $4.50 Countries in U. S. Spanish Postal Zone; $4.50 Canada; $5.50 Other Countries.

608 S. Dearborn St., Chicago (5), Ill., U. S. A.
Telephone WA bash 2-2435

FLASHES AND PLUGS

ALL THAT GLITTERS . . . Spokane, Wash., came up with a fine example of the Wonders of the Grapevine, recently. A Knight of the Steam Shovel, working in a residential neighborhood, hard beset by the usual questions of the Sandpile Set, devised a new and different explanation for his occupation.

"Whacha doin', Mister?"

"Digging for gold," he said.

The original statement was, at best, a slight exaggeration, but it soon ballooned out of such modest proportions. The kids told mama, who relayed it to the bridge club, from whence it moved downtown, and first thing you know the Better Business Bureau, the stockbrokers and the city officials were getting telephone calls. Not only, it seemed, had gold been found, but shares were for sale, and property owners were to come in for a fifth interest.

An emissary from the City Hall arrived hastily, and stock in the corner lot took an abrupt drop.

"Gold?" gasped the demoted 49-er, "I'm putting in a lawn."

• • •

ROCK-A-BYE BOY. A Milwaukee, Wis., magazine editor recently traveled to Calumet, Mich., to give a talk before some group.

The night of his arrival he left a call with the hotel desk to awaken him at 8 o'clock the next morning.

Came 8 o'clock and the hotel people rang the editor's telephone and pounded on his door but they couldn't get a peep out of the slumbering guest.

They finally called the fire department, put a ladder against his second floor window and sent a bellhop in to shake the man into consciousness.

"I forgot to tell you I sleep sort of soundly," the editor explained.

• • •

MAN OF PROPERTY. The hillbilly was disappointed to learn that the general store was out of his favorite brand of chewing tobacco.

"Be sure to telephone me," he admonished, "soon's you get some in."

"But, Lem," replied the surprised storekeeper, "I thought you don't have no telephone."

"I don't," answered the hillbilly, "but you do."

• • •

WHY, ALAS? A Wisconsin housewife contributes a new one to the "Questions Left Hanging in Mid-Air Department." She had just answered the telephone, the shampoo dripping off her nose.

"Adeline?" the caller asked.

"You have the wrong number," said the housewife with proper dignity.

"Well, why, then, did you answer the telephone?" her caller demanded.

CIRCULATION

Guaranteed circulation of this issue is 10,058, of which 9,568 is paid.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

August 14, 1954

Contents

SPECULATION ON THE FUTURE OF TELEPHONY 17
By Keith S. McHugh

IN THE NATION'S CAPITAL 20
By Francis X. Welch

THE PLANT MAN'S NOTEBOOK 23
By Ray Blain

PLANT MAN'S QUIZ 24
By Ray Blain

CARRIER SYSTEMS—Part 4 26
By Harold B. McKay

COURTS AND COMMISSIONS 30

HELPFUL LITERATURE 48

H. D. FARGO Jr., *President & Advertising Manager*
R. C. RENO, *Vice President & Editor*
H. D. FARGO, *Vice President & Treasurer*
A. J. STULTS, *Secretary & Western Manager*
DAN FARGO, *Managing Editor*
FRANCES E. CRETCHER, *Associate Editor*
RAY BLAIN, *Technical Editor*
FRANCIS X. WELCH, *Washington Editor*
MAYME WORKMAN, *Traffic Editor*
VIVIAN RYDEN, *Circulation Manager*

WESTERN REPRESENTATIVES:
McDonald-Thompson, San Francisco, Cal. Also offices in Los Angeles; Seattle, Wash.; Houston, Tex., and Denver, Colo.

Published by
TELEPHONY PUBLISHING CORP.

Vol. 147, No. 7. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn St., Chicago (5), Ill. 20 cents per copy (except special issues). Subscription $3.50 per year U. S.; $4.50 Countries in U. S. Spanish Postal Zone; $4.50 Canada; $5.50 Other Countries.

608 S. Dearborn St., Chicago (5), Ill., U. S. A.
Telephone WA bash 2-2435

SPECULATION ON THE FUTURE OF TELEPHONY

By KEITH S. McHUGH

The Answers To The Questions of a Young Friend

IT HAS BEEN just 28 years since I last spoke to this association at its meeting in Rochester. In those years we experienced first a major boom, then a major depression, then a major war, and finally, the "majorest" postwar expansion in telephone history. I sincerely hope that such a strenuous cycle does not repeat itself before I have a chance to be with you again.

Today, I would like to speculate a little about some of the things ahead for the telephone industry. The subject suggested itself rather naturally because I found myself talking about this recently with a young man graduating from college this month—the son of a close friend of mine. He stopped in to discuss the prospects for a telephone career and, as he said, "to get some advice."

I have found that when young men seek advice, they usually have their minds made up and merely want to make certain that you agree with them. They are something like the old gentleman who sat in the front row at church every Sunday and punctuated the sermon with frequent cries of "Amen, brother!" One day the minister chose a sermon that dealt with the evils of a life devoted only to pleasure. When he condemned gambling, the old fellow shouted "Amen, brother." A description of liquor as the devil's brew again drew a fervent "Amen." Then the preacher started on tobacco, declaring that chewing tobacco was not only evil but unsanitary as well. At this, the old fellow started up in his seat, shifted his plug and said, "That preacher ain't talking about sin; he's meddling."

As for my young friend, only time will tell whether he learned much from our talk; but it was good for me because it compelled me to appraise rather carefully our telephone future. One ought not mislead, even by inadvertence, a young man seeking his life work.

Observations to Young Friend

With your permission, I would like to repeat a few of the observations I made to him.

The most important questions about the future of the telephone industry seem to me to be:

Is telephone service something that people want and need; are they apt to want more of it?

Is it priced for growth?

Is its quality good; is this improving, static or slipping?

Is the industry progressive in technology or content to rest on its oars?

What about public regulation of service, rates and earnings—is this apt to be helpful or harmful?

Is the possibility for government competition or ownership an important threat?

What about the management—is it good—to what kind of management can the industry look forward?

These are some of the matters I speculated on with my young friend in the time available; no doubt each of you will think of others of importance.

The last question was answered first because it is the most important for the long pull. Quality of management undoubtedly establishes the ceiling of a business' performance. It does not necessarily establish the floor, for conditions beyond the control of management may undo its best efforts. Thus, while business may be worse than its management, it is seldom better.

Management Mostly Industry-Grown

We have been peculiarly fortunate in the telephone industry, in that we have always had to grow our own management people. This is compulsory because no one else is developing good telephone men and women except the telephone companies. We can't hire away a successful executive who knows the business from a company in an allied line because there aren't any.

All this means that we have had to plan for the growth and training of management people from the ground up. It means that we must plan for strength in depth at and below all levels of organization from the foreman and chief operator to the president. Because we have always known this we have worked hard at it.

Most thoughtful observers in other industries agree the results have been good. This reputation, coupled with the actual results accomplished in the industry, ought to be some assurance of good management for the future. Of course, they are no guarantee; each of us has a first responsibility to make the assurance come as close to a guarantee as possible.

Now to go back to the earlier questions about the commercial possibilities

of telephony; clearly, they are proven up to now. And they seem to me to have an even brighter future. We market a thoroughly accepted product which has always been priced well under its value.

The pessimist may retort that the industry has reached or is close to saturation in sales and there is little hope for further growth—all this because most businesses are now well-equipped with telephones and because four out of five families in our state have telephone service.

Sources of Future Business

No conclusion, it seems to me, could be farther from the fact. There are two directions in which the business can grow further, both with great possibilities. The first is in additional instrumentalities on subscribers' premises and the second is in increased usage of the service.

On the instrumentality side we have not even begun to educate and sell the average American family on the convenience of extension telephones and of intercommunicating within the household, even though the home is small. We have barely started to educate the American businessman in the range of valuable communications tools available, for use within his own premises or with the rest of the world.

We have a ready market of thousands of party-line customers who should experience the freedom and convenience of individual line service. And why shouldn't the household with teenage children have two lines so that father and mother can telephone in comfort?

The greatest single opportunity for growth, I believe, lies in increasing the usage by present customers. When one remembers that the number of long distance calls in New York state has doubled in 10 years, one gets a faint appreciation of the possibilities ahead.

Local call usage, too, from both subscriber and public telephones, offers wide possibilities for stimulated growth. This market has received much too little attention.

As we further improve the quality and scope of telephone service and the instrumentalities on users' premises, the over-all possibilities for growth are very wide indeed.

Price of Service a Bargain

On the price question, all of us have had ample evidence during the last 12 years that telephone prices are well below the value point. During that period we have been confronted with growth problems requiring fantastic quantities of new plant and capital. Do you think all this demand would have developed had our prices been too high?

We have about four million customers in the New York Telephone Co. and many of these have been careful to preserve that traditional American right of sitting down and writing the president. Only a biased reader of the letters I have received over recent years from people who had to wait for telephone service, could conclude that our prices are too high.

The importance of telephone service in the home or the business is so great that in all the hundreds of such letters, no writer raised the question of price.

Fortunately too, the quality of telephone service has steadily improved. Despite the extreme shortage of materials during and subsequent to World War II and Korea, the quality, speed and reliability of service are now better than in 1940 and the technical measurements of service quality are at all-time highs. This is a proud record for an industry that has more than doubled in size during these same years.

And, speaking of good service, I have the warmest praise and admiration for you managers and owners of Independent telephone companies. Under the most trying conditions of growth and earnings, you have generally succeeded in securing the necessary financing and had the courage to expand and improve your service. The continuing fine spirit of cooperation throughout the industry in our state which has worked to such great advantage for the customer is probably unique in American industry.

Because the industry has that kind of a record—a record of looking after its customers when conditions are difficult—there is good assurance that the quality of telephone service for all will continue to improve in the future.

Technological Future

When it comes to speculating on the future of the business technologically, I must move somewhat more cautiously because while I was an engineer once, our youngest engineering graduate would put me to shame in technology today.

Of course, the doubter may say that there is nothing left to do technologically. He would insist that the newest telephone instruments are light, convenient, possess superb transmission qualities and have low maintenance costs. He would say that central office switching has been so improved in quality and costs, as to cover every range of requirement and to leave little to be desired. He would urge that carrier systems, coaxial cables and radio relay enable us to put hundreds of circuits over the same amount of copper which in by-gone years carried only a few circuits. He would conclude, "What else is there to do?"

But the scientist in the telephone laboratory would chuckle at such a question and tell the doubter that we have hardly started on improvement and progress.

Semi-Conductor Frontier

First, there is a whole new area of research going forward in what the scientists call solid state physics, particularly the semi-conductors. These materials, germanium, silicon, and selenium, copper oxide and silicon carbide, will not conduct electricity nearly as well as a metal like copper but are somewhat better than the non-conductors like glass or rubber. They have peculiar characteristics which have long been known but not understood until recently after years of research by Bell Telephone Laboratories scientists.

If you were an early radio fan, you will remember the silicon or galena lumps on which you carefully adjusted a wire cat whisker to convert radio signals to audible sounds. You were dealing with a semi-conductor, but you probably didn't know it and no one really knew how it was able to do what it did.

From these exhaustive laboratory investigations has come a tiny gadget called the transistor. It will do most of the things that a vacuum tube can do and many things which a tube cannot do. Compared with a vacuum tube designed for the same purpose the transistor is smaller, more rugged and operates efficiently on about one-millionth of the power.

The potentialities of the transistor and related semi-conductor devices in telecommunications have opened up dramatic new vistas to the inquiring eye of the scientist and the telephone engineer.

The telephone engineer knows of course that it will take time—probably several years—to develop fully the communications possibilities of these tiny gadgets and even longer to get them into the telephone plant in quantity.

One does not change easily or quickly this complex system for reaching anyone, anywhere, in the shortest possible time. New devices, new circuits, all must be integrated into the existing system if it is to function continuously and well. Both the capital costs and the practical difficulties of major changes in the art are large.

Miniaturization Coming

Nevertheless, developments in solid state physics contain endless possibilities for technological improvement of our service over the years ahead. They make it possible to operate with much

less power. They permit circuit speeds measured by millionths of seconds rather than by thousandths. They permit miniaturization of many components.

All this may mean switching systems of the future which are completely electronic with no relays and which would occupy a fraction of the space now necessary. And the new art may well make possible a rural service on a telephone carrier employing transistors and using the new solar battery, developed from these same studies, to supply all local battery requirements. The sun that shines for all of us would be our source of local power.

Speaking of the solar battery, I heard last week a phonograph record played over a loudspeaker using transistor circuits and the only source of power was a new solar battery held outside the window in the palm of an engineer. The sky was clouded over completely.

K. S. McHUGH, president of the New York Telephone Co., gave this address before the recent convention of the New York State Telephone Association.

Reducing Outside Plant Cost

Then there is the technical possibility of important developments to reduce the great cost of our outside plant. In many ways the subscriber's local loop plant is the most inefficient thing we have in the business. The pair of wires, perhaps several miles long, from the customer's home to the central office, may be used a few times a day, but most of the time it lies idle.

The average telephone company has perhaps 25 per cent of its investment tied up in this kind of plant. If we could devise ways to use that plant more efficiently—to connect new customers without degrading their service and without having to add new lines—there would be great economic gains.

And it looks as if this may be possible. Usually, not more than about one out of five customers wants to talk at the same time, and today the central office concentrates many of these long pairs from subscribers into perhaps one-fifth as many talking paths.

With switching devices using semiconductors, it appears possible to do this concentrating out near the customer's location so that individual pairs need not run all the way into the central office. In effect, the switching office would be broken into many parts with these parts located near clusters of subscribers.

In the past, the cost of remotely located concentrators has been prohibitive because power, buildings and maintenance arrangements were required for the relays and switches. But with electronic devices the power required is so small it can be transmitted over telephone pairs. The remote switching devices are truly miniature. They can be housed in boxes on poles or in manholes and there are no moving parts so maintenance should be small.

If these line concentrators prove practicable, and the initial prospect looks good for use with one new type of central office switching—it may be possible to give such subscribers individual or two-party service with a line concentration almost equivalent to the present eight-party service. Savings up to 75 per cent of the line plant between the central office and the concentrator could be possible.

Thus the rural telephone carrier system, the line concentrators, the solar battery, all coming from fundamental research with semi-conductors, may some day help tremendously to solve one of the most difficult problems the telephone man has to face—his outside plant costs in urban and rural areas.

Incidentally, I think all of us can be proud of the job that the telephone companies in this state have done for our rural friends. Four out of five establishments in the farm area of our state have service today and a high percentage of the remaining non-users could receive service without special construction costs. There is substantial further growth developing throughout the state. Transmission has been improved and the number of parties per line has been steadily reduced. I know this is a satisfaction to all of us and it must be even more pleasing to the farmers.

Handling Long Distance Calls

Perhaps the most spectacular improvement in technology from the customer's standpoint, has been the rapid introduction and extension of automatic or semi-automatic handling of long distance calls. Toll operator dialing which so greatly speeds up service is now well established all over the United States, and this year our company will handle about 60 per cent of all long distance messages by this method. Some Independent companies in the state which entered this program at an early date and are favorably situated geographically are operator dialing a high percentage of their long distance calls.

The new 4-A systems for automatically handling long distance calls are required at about 60 key switching points across the United States. They are being added rapidly so that in New York state, for example, we now have them in New York City, Albany and Syracuse, the last being cut over on May 2 this year. The Buffalo 4-A system will conclude the job. We hope to complete it by the spring of 1956. Each cut of a 4-A system adds more Bell and Independent toll centers to the dial intertoll network.

Finally, at many places, telephone users are able to dial direct to larger and larger numbers of telephones and over longer distances. Nationwide dialing is a proven possibility. Most of us will, I hope, live to see it in general operation over the United States.

Communication services supplementing local and long distance service, too, are growing and improving rapidly. Special private line service, urban and inter-city radio services, and special switching arrangements for large customers—all are now an integral part of the telephone picture.

Who knows but that in a relatively short time Dick Tracy's wristwatch radio—already a laboratory reality—may be used to receive a signal which will tell you, no matter where you are, that you are wanted at the nearest telephone!

These new developments and those that are yet but gleams in the eyes of the telephone scientists, will surely come. But they are evolutionary, not revolutionary, and they will take time and capital, a great deal of capital, to give them wide practical application in telephony.

Management's Challenge

The challenge to management, therefore, is two-fold:

First, to bring along new developments that are better and cheaper.

Second, to see that the business does well financially at all times, so that investors will continue to put their savings into our businesses.

Both are essential if these new developments are to be put to work for the customer.

I mentioned these things to my young

(Please turn to page 42)

by FRANCIS X. WELCH WASHINGTON EDITOR

Strict cost-of-capital test rejected in District of Columbia rate decision. Connecting company agreements reached with REA borrowers. Senate group to question Federal Communications Commission on UHF TV licensee situation. Discusses possible future FCC commissioner.

THE District of Columbia Public Utilities Commission has thrown some new and interesting light on factors to be considered in determining a reasonable rate of return for a telephone company. This came in the commission's recent opinion authorizing the Chesapeake & Potomac Telephone Co. to increase its rates in the nation's capital by approximately $1,625,000 in annual gross revenues. (The company had asked for $4,400,000.)

The commission decided that the company should be allowed rates which would provide a return up to 6.25 per cent on its net capital invested in intrastate operations, no allowance being included for cash working capital. In discussing the rate of return, the commission stated:

"On strict 'cost of money' considerations, our subsidiary findings indicate that the company's position can be maintained with a 6.1 per cent return at the present time.

"This figure would no doubt be above the level of confiscation; however, in the present case important considerations point toward the fixing of a rate of return slightly higher than that provided by the 'cost of money' analysis.

"These considerations include: the period of time during which the company has served at a rate of return substantially below that established as fair and reasonable in the last rate order; the clear possibility of contingencies increasing the company's costs in the future above the now-predicted levels as has happened in each of the years during the recent past; 'value of service' considerations; and the other intangibles to which we have already adverted.

"We believe that under the present circumstances the company is entitled to a return which will in theory at least provide a reasonable cushion against the contingencies which have in the recent past prevented it from actually earning in accordance with its own and with the commission's estimates."

Another aspect of this case was the commission's acceptance of the use of the year 1954 as the test period to forecast the company's revenues, expenses, and investment for that period. Adjustment was made in the estimated revenues based on subsequent information available as to the actual level of revenues for the first three months of 1954.

Connecting Company Agreement

The Rural Electrification Administration and a large Independent telephone system have come to a partial understanding concerning "connecting company agreements" with REA borrowers. A "connecting company," in this sense, is an Independent (non-Bell) which participates with another company (generally Bell System) in a mutual extended area service arrangement. The possibility of working out uniform standards for extended area service agreements has been under discussion for some time between REA officials and representatives of the USITA and the Bell System. The latest agreement is proposed for companies connecting with the Southwestern States Telephone Co., Brownwood, Tex. It follows closely the agreement approved by REA for Southwestern Bell Telephone Co. late last year.

While neither company concurs entirely with REA concerning these matters, both have offered contracts to connecting companies which REA believes will be satisfactory to the majority of its borrowers. Under the plan offered by Southwestern States, the connecting company (REA borrower) must provide for its own switching costs and extended area service trunk costs to the point of the exchange boundary between the two companies. In addition, the connecting company must pay the Southwestern States company an amount equal to 40 per cent of the annual carrying charges for extended area service switching and trunk facilities in the Southwestern States exchange.

REA officials emphasize that its acceptance of the Southwestern States agreement does not constitute REA approval of widespread extended area service. In each instance where extended area service is proposed, REA will continue to insist that the proposal be carefully reviewed to ascertain that there is a genuine community of interest between subscribers in the combined area. Subscribers must also be willing to pay the additional rates that will be required to cover the cost of such area-wide connection service. REA regards the agreement reached with Southwestern States as a considerable improvement over agreements previously offered by the company. "They provide a workable basis upon which our borrowers can proceed with their connecting company arrangements," REA stated.

Senate Group to Quiz FCC

Even though Congress may have adjourned by the time these lines appear in print, there is one agency that is still going to feel the pressure of Capitol Hill investigation. That is the Federal Communications Commission. Senator Bricker (R., Ohio), chairman of the Senate Interstate Commerce Committee, has not been happy with the way FCC has been regulating television and radio. This does not involve any complaint about the commission's work in the field of telephone companies or other so-called "common carriers."

Bricker is not out to needle the FCC, as a whole, nor any of its individual members. He says the FCC may well be 100 per cent right on the course it has been following. But there has been so much complaint and uncertainty, especially with respect to the fight between the ultrahigh frequency (UHF)

TV licensees and the very high frequency (VHF) licensees that the committee just wants more light on the subject.

In other words, the senator is not mad at anybody; he just wants to get some questions answered. And so he got a resolution approved by the Senate Interstate Commerce Committee to start work on an investigation of radio and television networks to see whether they are sufficiently under control of the FCC. That will be the main objective of the investigation. But as part of the package, the FCC itself will be almost certain to get into the witness chair.

Under the present law, individual broadcasting stations are now subject to FCC rules. But radio and TV networks are not subject to the FCC, and some people seem to think they should be. The Senate committee authorized the hiring of two investigators to look into the matter, and they will be working during the congressional recess.

Although the investigators have not been chosen yet, it is understood that Senator Bricker has in mind as the chief investigator a former FCC member, Robert F. Jones, now a Washington lawyer. He also is a former Republican congressman from Ohio. And while on the FCC, Jones found himself dissenting from the majority with respect to radio regulatory policies. Investigator Jones would thus go into his new job with ideas of his own and no particular awe of the FCC as such.

The new network investigation will serve to broaden the committee's attack on the whole problem of the future of television as it was raised in the UHF hearings before a subcommittee, headed by Senator Potter (R., Mich.).

Some 28 UHF stations have gone off the air in recent months. They couldn't make the grade financially against the older established VHF competition. UHF operators have pleaded for drastic action. But just how the FCC or

Four REA Telephone Loans Include First for Alaska

The Rural Electrification Administration, during the period from July 19 to July 30, approved four loans for improving and extending rural telephone service in Alaska, Georgia and North Dakota. Details of the loans, which totaled $1,666,000, follow:

Reservation Mutual Aid Telephone Corp., Parshall, N. D., on July 23 was allocated $109,000, third loan to this borrower.

These loan funds will be used to finance the construction of 39 miles of additional line, the purchase and remodeling of a headquarters building, and facilities to serve 11 subscribers not included in the prior loans. In addition, this loan will cover increased construction costs involved since the first two loans were approved.

The three loans, totaling $1,007,000, will make it possible for the Reservation corporation to serve 1,429 subscribers and 100 switchers over 774 miles of line in McKenzie, Mountrail and McLean counties. The Newtown exchange has been cut over to dial operation, and about 450 subscribers are now receiving dial service in that general area.

Donnell Haugen is president and F. W. Ahlgren is manager of the Reservation Mutual Aid Telephone Corp.

* * *

Wilkes Telephone & Electric Co., Washington, Ga.; on July 27, allocation of $66,000, fourth loan to this borrower.

These loan funds will be used to finance the construction of 23 additional miles of line necessary under revised plans of the borrower.

The four REA loans, totaling $868,000, will make it possible for the Wilkes Telephone & Electric Co. to furnish new and improved service to 2,582 subscribers in Taliaferro, Wilkes and Lincoln counties.

Since the first loans are approved, the Washington (rural), Tignall, Rayle and Metasville central offices have been cut over to dial operation. The borrower has also acquired the Washington and Lincolnton exchanges from the Georgia Continental Telephone Co., and the Crawfordville Telephone Co., integrating these properties into the operating system. The Washington (urban) common battery office and the dial facilities at Lincolnton will be retained, and new dial office equipment installed at Crawfordville.

The completed system will consist of 511 miles of line. C. S. Dyson is president of the Wilkes company.

Matanuska Telephone Association, Inc., Palmer, Alaska, on July 29, $567,000. This is the first REA telephone loan in the territory of Alaska and it will be used to improve and extend rural telephone service in Matanuska Valley.

These funds plus funds of its own will enable the new cooperative to furnish modern telephone service to 710 subscribers, including 516 now without telephones, in and around the rural centers of Palmer, Wasilla and Chugiak.

The borrower proposes to acquire the telephone facilities serving 194 subscribers over 22 miles of line in the town of Palmer. The common battery switchboard in Palmer will be replaced with dial equipment and new dial facilities installed at Wasilla and Chugiak. About 165 miles of new line will be constructed and all of the existing line rebuilt. Subscribers in the Palmer exchange area will be able to call those in the Wasilla area without toll charge.

The completed system will consist of 187 miles of line. Lew Hanks is president of the Matanuska Telephone Association.

* * *

Standard Telephone Co., Cornelia, Ga., also on July 29, $924,000, to finance the extension and improvement of rural telephone service in Banks, Dawson, Habersham, Lumpkin, Towns, Union and White counties.

The borrower proposes to furnish new and improved rural telephone service to 3,546 subscribers in north central Georgia. At present the Standard company is serving 2,452 subscribers. The borrower plans to issue capital stock to acquire the Helen (Ga.) Telephone Co., now serving 74 subscribers.

Loan funds will be used to construct 266 miles of new line and rebuild 83 miles of the existing line. The Blairsville, Dawsonville and Helen central offices will be converted to dial operation; the Clarkesville, Demarest and Hiawassee dial switchboards enlarged; and the Cleveland, Cornelia, Dahlonega and Young Harris common battery offices rehabilitated and expanded. With these changes, the Standard company will be able to serve 1,094 now unserved subscribers in its service area.

The completed system will consist of 440 miles of line. H. M. Stewart is president and manager of the Standard Telephone Co.

Congress can rescue them is something nobody has been able to make very clear. Recommendations varied all the way from moving all TV broadcasting to the UHF band, to simply eliminating the excise tax on UHF sets in an attempt to increase sale of all-band sets.

The FCC recently announced a new policy that will permit television stations to set up "satellite" stations operating on ultra high frequencies. The new policy also would permit new UHF stations carrying only "canned" programs, without any local shows. The policy will take effect Sept. 1 and the FCC said it will consider applications for the new type station only on a case-by-case basis.

A commission spokesman said the purpose of the new policy is to "get UHF going." But Commissioner Frieda B. Hennock said, in a dissenting opinion, that the commission's action "kills UHF television." An FCC spokesman said the satellite provision would allow a TV broadcaster—on either a very high or ultra high frequency channel—to operate a secondary station on the UHF band that would pick up programs of the master station and relay them into an extended area.

The spokesman said there would be no limit on the number of "satellites" a station could have, except that the commission's multiple ownership rule would apply to the secondary as well as the master stations. The rule now limits one firm or individual to five TV stations. But the commission has proposed to boost this to seven, providing that at least two of the stations are on UHF channels.

The FCC said it would waive its rule against one firm or individual owning more than one TV outlet in the same area in case of "satellites" which it may authorize. The FCC said it decided to allow new UHF stations without local programming because the high cost of necessary equipment has "acted as a deterrent" on prospective UHF operators. A spokesman said stations could be started showing just films.

All this has little to do with the telephone business. But it goes to show the kind of headaches the FCC has these days with TV and Congress.

Governor Persons to Make FCC a Stag Affair?

Alabama newspapers are carrying "dope stories" to the effect that their Governor Persons is in line for an appointment with the FCC. This will interest telephone people if for no other reason than Governor Persons, in the past, has interested himself in the affairs of the telephone business. It will be recalled that, as a former chairman of the Alabama Public Service Commission, he was a sort of spiritual godfather to the legislation, subsequently introduced by Senator Hill (D., Ala.), amending the Rural Electrification Act so as to provide for rural telephone loans. This became a law in 1949 and Persons later became governor of Alabama.

Persons' term as governor expires on Jan. 1. At that time there is not expected to be any vacancy on the FCC. But the personable lady commissioner, Frieda B. Hennock, is due to be replaced when her term expires in June, 1955. That is a long way off to be talking about a replacement. But Miss Hennock's replacement would have to be a Democrat under the law. Governor Persons is a Democrat. His brother is General Persons, who is a White House adviser to President Eisenhower. Points like that sometimes make a difference.

It may be the administration boys have figured out some way to persuade the controversial Commissioner Hennock to step down ahead of time. But she showed no signs of quitting the last time this writer saw her.

Hot Weather Items

The argument over which is better—electing public service commissioners or appointing them—has raged for many years. They are appointed in about two-thirds of the states. In the other third, mainly among southern states, they are elected. Both systems have produced some mighty good commissioners. But the elective system seems to produce the lighter touches in the otherwise prosaic business of regulating utility industries.

Last week they had a primary election down in Tennessee in which Senator Kefauver (D.) and Attorney Ray (Army-McCarthy) Jenkins (R.) were nominated to fight it out for the senatorship next fall. Overlooked in that battle was the Democratic (usually tantamount to election in that state) nomination for the vacancy on the Tennessee Public Utilities Commission. Seeking renomination and re-election was a member of the present commission with the Biblical name of Cayce L. Pentecost. You have to give Commissioner Pentecost credit for being different. A disk jockey, one Lee Dorris (Three-D Lee-D) was persuaded to plug his candidacy to the teen age jive set, along with the other hot platters.

According to *Time Magazine* of Aug. 2, here is a sample of Lee Dorris' exposition of Commissioner Pentecost's merits: "Greetings, all you hep cats, gators, lame janes and dream queens. This Lee D speelin' at you about a real gone cat from Goneville, Cayce L. Pentecost, a real boogie in the know. He's no square from Chicago. Cayce Pentecost is my man's name; by square-dealing he won his fame. Do this for me on Three-D. When you go to vote on August 5th, do me a real daid of stuff. Lee D is in favor of it, and I know you will be too. Vote for Cayce L. Pentecost. . . . He's a real deal, dad. . . . You hear?"

Sounds like Pentecost ought to make a mighty interesting public utility commissioner at that. If he can "get hot" on some of these rate cases and cut out the "blue notes," the result ought to be "real cool" for the utility folks down Tennessee way.

* * *

Every newspaperman in Washington last week was saddened by the news of the passing of one of the pioneer telegraph editors in the journalistic profession. He was E. O. Bishop, known and beloved by the Washington Press Club as "Bish." In a dignified way he was a cartoonist's idea of a portly senator—wide-brimmed hat, windsor tie, and benign expression. He was as Texas as the Alamo and he let you know about it, right off.

Stories about him are legion. But this writer likes best the tale of when Bish was a telegraph editor in the good old days when every newspaperman worth his salt knew his Morse code backwards and forwards.

For example, one time during a celebration in honor of Thomas A. Edison (during the latter part of his life), the great inventor, stone deaf at the time, astonished the audience by apparently understanding every word that was spoken. They didn't know that Bish was sitting right behind him poking his finger in Edison's back in Morse code.

Bish's favorite practical joke was to astonish Washington taxicab drivers by his seeming psychic ability to forecast plays in baseball game broadcasts coming over the taxicab radio. "This fellow is going to strike out," Bish would tell the driver as they were driving around Washington. Sure enough the announcer's voice would come in a few seconds later with the announcement that so-and-so had struck out.

"The next fellow is going to hit a single," Bish would say. It happened just that way, and so on until the taxicab's eyes were popping. He didn't know that Bish was simply listening to the Morse code tapping of the telegraph key which was coming in over

(Please turn to page 40)

THE PLANT MAN'S Notebook

by Ray Blain, Technical Editor

WE WERE recently privileged to read a report on "Maintenance of Automatic Telephone Exchanges" made by a productivity team representing the British Post Office Engineering Department after a visit to this country in 1953.

The team reports as follows on the qualitative maintenance policy of step-by-step switching equipment:

"There is no denial that 'preventive maintenance' in the form of periodic tests and overhauls of equipment is a logical aid to reliability and good service in any business, and it used to be followed in American telephone exchanges as in the United Kingdom. But, many years ago, the Bell System decided that complete and regular overhauls of the step-by-step switch were a luxury they could not afford. Factors in the case appear to be inherent reliability of the apparatus and the fact that a percentage of the switches can be imperfect without seriously degrading the over-all quality of service to the subscriber.

"The serious telephone strike in 1947 confirmed doubts as to the need for many other preventive maintenance procedures, particularly the functional testing routines which were already less frequent than in the British telephone system; and this gave rise to what is now called the 'qualitative maintenance policy.'

"In spite of the sincere belief of many experienced men in the field that service quality would collapse if preventive maintenance were dropped for more than a brief period, the American Telephone & Telegraph Co. obtained the cooperation of 100 exchanges (step-by-step, panel and crossbar) in a two-year field trial, and the experiment has been continued for five years with complete satisfaction.

"Briefly, the instructions were to cease all routine preventive maintenance except for a few 'insurance routines,' such as lubrication, cleaning and the testing of alarms. The state of the automatic plant and the quality of the service were then to be carefully watched, by a logical interpretation of statistics plus inspection of the plant by sampling, if necessary, and by careful attention to faults as and when they were reported.

"Only on the results of such general observation was any large scale maintenance work to be done and, even then, each occasion of functional testing in bulk, or wholesale changing or adjusting of parts, was to be an individual project to deal with a known deterioration. Compared with the precautionary work on a preventive routine cycle there was less work to be done, and each operation produced a positive result which could be seen and appreciated by the staff.

"The field trials showed that the large majority of exchanges adopting the new policy gave a slightly better quality of service, in spite of a slight increase in faults found, and that there were no serious service reactions anywhere.

"The supervisors at some exchanges decided that functional tests should still be done at fixed intervals instead of 'as required,' but these intervals varied by as much as 12 to 1 and most of them were little more than long-term insurance checks at one or two-year intervals. The maintenance man-hours in the trial exchanges were reduced on an average by 20 per cent.

"Only recently has this new maintenance philosophy been recommended for general adoption and it has been recognized that it must be implemented with a planned approach by means of local committees. Such basic changes in practice required the full cooperation and faith of all concerned. An appreciation of the service risks to be incurred is also essential, and adequate statistics must be kept for the local supervisors to determine what action is to be taken; then to act promptly without waiting for higher authority.

"The start of the qualitative maintenance policy at a particular exchange must necessarily be sudden, but more than usual care is required during the first two years while the detailed practices are being developed. Thus it is not practical to introduce the policy simultaneously everywhere, nor is it desirable to impose it arbitrarily on men who cannot be persuaded to cooperate. Moreover, the new procedure is being introduced slowly in a growing system so that no employes are being laid off in spite of the staff reduction in individual exchanges."

The team also made the following report on the use of automatic testers and routiners:

"In view of the widespread use for many years of automatic routiners in British exchanges, the team was asked especially to find out why these automatic 'routiners' are not used in the United States. It must first be pointed out that routiners are not completely excluded from American practice. They are found in panel exchanges and even in some step-by-step exchanges operated outside the Bell System; some automatic routiners for line insulation are also introduced. But it is true that manually-operated testers are generally preferred.

"There would appear to be three reasons for this. First, even before the new maintenance philosophy was introduced, the American preferred to break down functional tests into separate items, so that checks of the more important functions (such as impulsing) could be made more often than the testing of secondary functions or other details with a lower fault liability.

"Second, and associated with this, is the tendency to avoid applying standards more stringent than working conditions and to substitute the personal observation and listening of the craftsman who operates the simple test box.

"The third consideration is the longer interval between tests inasmuch as the manpower to be saved by automatic operation is not sufficient to justify the high cost of providing and maintaining comprehensive routiners. This factor is intensified now that plant testing in the United Kingdom once a week by automatic routiners is, under the qualitative maintenance scheme, undertaken

about once a year. It was also noted that there are no artificial traffic equipments such as are now being introduced in the United Kingdom, for passing test calls automatically through the exchange network."

• • •

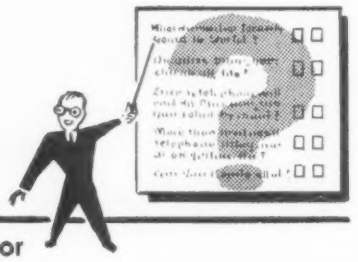
The question is frequently asked as to when we shall be able to see by telephone. Actually, this service is available today for a price.

It is possible for any company to hire TV time for a sales conference. For example, salesmen in Chicago could see and talk to other salesmen participating in a sales conference in New York City. Then, by means of a split screen, they may be seen as they ask questions.

The only trouble is that this service would cost $4,000 or more and there is not much demand for it. However, perhaps in the not-too-distant future it may be possible to arrange person-to-person television calls between our larger cities.

Perhaps, too, this service will be arranged by appointment and the participants on each end of the line will go to a central point to talk and see.

PLANT MAN'S QUIZ



by RAY BLAIN, Technical Editor

Q. We plan to make a 26-pair cable extension to an existing 50-pair, and will appreciate advice as to whether it will be considered satisfactory to install two terminals on the same pole and then cross-connect the new cable with the old by running jumpers between the two terminals. Our reason for this plan is that if trouble develops in one cable, it will not affect working pairs in the other as it would if the two cables were spliced together permanently.

A. There are no serious objections to cross-connecting between terminals in the manner that you suggest. However, such an arrangement generally is not considered standard practice except in a few cases where it will provide better distribution.

Although it is true that with this arrangement, defective pairs in one cable will not affect pairs in the other cable, it is likewise true that when a few pairs develop trouble in any cable, the entire cable generally fails in a short time if the fault is not located and repaired.

Personally, we prefer to have cables spliced together permanently whenever it can be done conveniently since cross-connecting terminals, in many cases, prove to be just another possible source of trouble.

• • •

Q. Will the magnesium type extension ladder prove suitable for use by telephone station installers?

A. This type of ladder is lightweight and strong, but, due to the fact that it is a good conductor of electricity, most telephone companies do not favor its use.

Perhaps someone will eventually devise a means of insulation for this type of ladder so that it will prove safe for use by utility companies.

• • •

Q. We have several business subscribers who have a need for more than one main line telephone but who do not want a small PBX because of the bother and expense of operation. Will it be possible to handle this type of service on a key type system?

A. There are several types of key systems on the market that should prove ideal for installations of this nature. These systems may be used to originate and answer calls from one to six central office or PBX lines.

It is also possible to hold calls on from one to five lines and signal or intercommunicate on private lines. The various stations may receive, originate and transfer calls between several stations and lines without the help of an operator.

• • •

Q. We would like to know if it is possible to obtain a calculagraph to operate on the commercial power supply.

A. These instruments are now available and are equipped with a synchronous motor for 20 volts, 50 or 60 cycles; or 115 volts, 50 or 60 cycles. The current consumption is about 2 watts.

Whenever it is considered desirable to keep 110-115 volts alternating current out of the switchboard, step down transformers are available to provide the 20 volts. One size is designed to operate a single calculagraph and a larger size to operate 1 to 7.

• • •

Q. Will it be safe to use a winch line to pull a wire-armored cable across a river for a distance of nearly 3000 feet?

A. Such an arrangement would probably prove safe because wire-armored cable will take a considerable strain before it develops trouble.

However, in order to play safe, we would suggest that two empty oil drums be attached to the pulling end to keep this from the bottom of the river where it might catch on tree stumps, rocks, etc., and place a greater strain on the winch line. This extra precaution is considered well worth the extra bother as a safety insurance.

• • •

Q. Will it be possible to push a 4-inch pipe under a railroad tract for a distance of nearly a hundred feet?

A. This size of pipe may be pushed for the required distance if you are properly equipped for the job. We suggest the use of a pneumatic pipe-pushing machine.

We recently visited a construction job where a 4-inch pipe was pushed easily and accurately for a distance of 132 feet.

• • •

Q. We will appreciate it if you will please furnish us with drawings and specifications for use in building a storage battery rack to support a new battery which we contemplate purchasing.

A. It is suggested that you purchase the necessary rack from the company that furnishes your storage battery. This will probably be a better rack than you will be able to fabricate locally and may prove more economical.

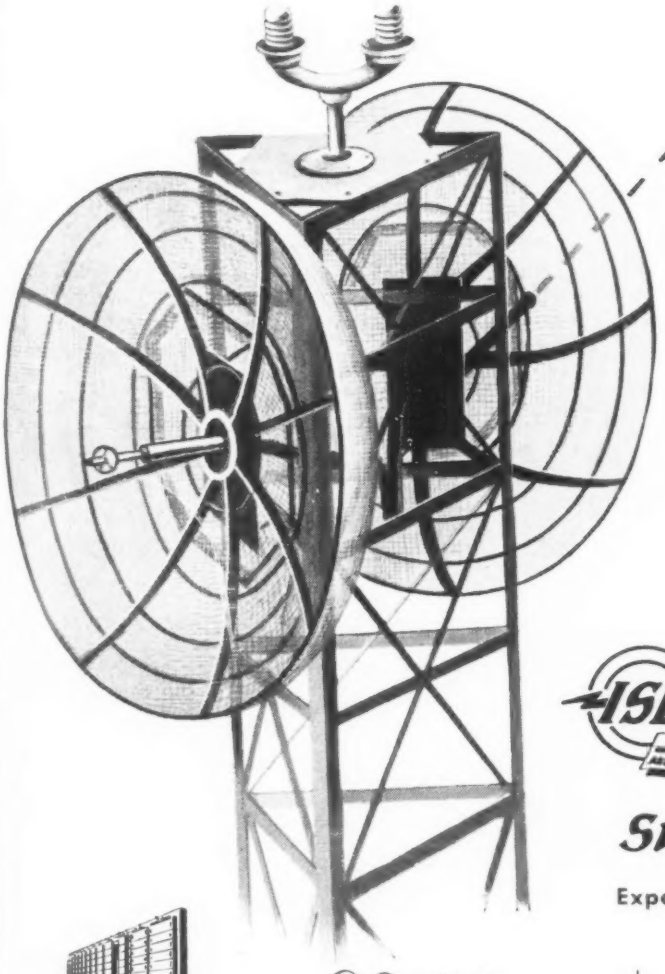
• • •

Q. In your opinion, will it prove satisfactory to connect telephone apparatus on the same ground rods which are used for power grounds? And will it be safe to use a lightning rod ground for telephone grounding?

A. When driven ground rods are used, the telephone and power should be connected to individual rods that are separated by at least 6 feet of earth. If this is not done, surges and poor ground connections may cause trouble on the telephone plant. However, both services may be connected to a good water pipe system.

Lightning rods should never be used for grounding any telephone apparatus.

. . . the communication system of the future for LATIN AMERICA



Ready today through ISE

Microwave radio relay systems are revolutionizing communications—by eliminating wire lines. Microwave provides dependable communication between points separated by jungles, forests, waterways, and mountainous areas—and *stays in service* regardless of the storms that so often play havoc with wire circuits. Developed originally by International Telephone and Telegraph Corporation, microwave in its most advanced form is available now through ISE, an IT&T associate. Look to ISE for the finest in microwave—for the finest in communications equipment of every kind.

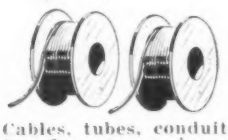
FACTORIES IN SOUTH AMERICA: Cia Standard Elec. Argentina. S. A. Ind. y Com., Buenos Aires, Argentina • Standard Electrica, S. A., Rio de Janeiro and São Paulo. Brazil • Cia Standard Electric. S. A. C., Santiago, Chile.

International Standard Electric Corporation

WORLDWIDE EXPORT DISTRIBUTORS

Export Department, 50 Church St., New York 7, N. Y., U. S. A.

Central telephone exchange equipment for installations of any size, automatic or manual.



Cables, tubes, conduits, transformers — equipment, supplies for every communication and power need.

Radio aids to air navigation . . . complete airport communications and lighting.

Teleprinters for automatic transmission and reception of written messages.

All equipment for television and radio broadcasting and receiving . . . point-to-point communication.

CARRIER SYSTEMS

By HAROLD B. McKAY

Part 4—Signalling

THE APPARATUS which we have described so far is the basic equipment necessary to place several voice channels on a single pair of wires by means of carrier current. While many extensions and refinements of this equipment have been made, all of the essential circuit details for a simple carrier system have been discussed.

However, in addition to carrying voice currents, telephone circuits usually must carry signalling information as well. This signal may be the energy necessary to operate a ring-down trunk, it may be a train of dial pulses, or the switchhook supervision from a customer.

On regular wire-line circuits, each of these functions is usually handled with either direct current, or low frequency ringing current.

In carrier systems, direct current may be transmitted over the metallic pair, but not on the channels. In fact in many systems, the original trunk remains in service over the pair, and the carrier added to it. However, the carrier will handle many circuits, and each one requires its own signalling circuit. Because the carrier is designed to carry alternating current in the voice frequency range, it will not handle low frequency ringing, or direct current on each of the separate channels.

In order to transmit signal information, the original signal, be it dial pulse, ringing or something else, must be converted to a type of current which can be handled by the carrier. There are many ways of doing this. Some involve additional carrier equipment and amplifiers; some operate by means of the external trunk relay equipment.

A complete description of every type of telephone signalling ever used is beyond the scope of this article. We are concerned here with how the carrier equipment functions with different systems. There are different methods employed by the manufacturers to transmit signalling information, and carrier installations can be furnished to coordinate with whatever signalling method the company is using.

The signalling equipment in the carrier may be an integral part, or it may be a separate unit which is added if required. Some of this equipment is arranged for either ring-down or dial service by changing an arrangement of straps or cross-connects. Coupling the carrier signalling equipment to the switchboard or trunk circuit involves the use of relays which cut in circuits to convert the regular signal to one which can be transmitted by the carrier.

E and M Leads

Most commonly used designations for signalling circuits on long haul circuits are the E and M leads. These leads are present only in the trunk relay equipment and connect to a simplex, composite or carrier system. They lose their identity as soon as they enter one of these circuits, and they are not present in the switchboard end of the trunk.

The letters E and M do not stand for any particular words. They are part of a series which formerly also included the letters F and N. In practice, the E lead is the wire by which supervision, dial pulses or other signals are received by a trunk circuit. The M lead is the wire by which signals are sent forward by the trunk.

For instance, a switchboard trunk consists of a tip, ring, sleeve and lamp lead. On a full metallic circuit, only the tip and ring would carry the signalling. However, on a simplex, composite or carrier, the signal is handled in a different part of the circuit. In the first two, the signal travels on a grounded circuit. In the carrier, it may travel on a different frequency.

When an operator seizes a trunk as described above, she supplies battery to the sleeve of the jack. This can be made to operate a relay, the contacts of which will supply battery to a wire called the M lead. The battery can energize the separate route used for the signalling and transmit the signal to the other end.

On an incoming call, battery may be derived from the simplex or other circuit which will operate a relay which will put a ground on a wire called the E lead. This ground can be made to light the switchboard lamp.

Later, as the conversation goes ahead, the same circuits can be used to provide supervision in both directions. The same leads can be coupled to respond to dial pulses, ringdown circuits, etc.

Carrier Signalling

There are many ways that the E and M lead information can be coupled to a

Order Reprints Now

Reprints of the completed series on "Carrier Systems" will be available following its publication in TELEPHONY (last installment to appear in the Sept. 18 issue), *providing sufficient orders are received to justify reprinting.* Companies desiring reprints for their employes are asked to inform TELEPHONY the quantity they will need as early as possible.

Harrisonburg, Virginia . . . goes dial with HOLTZER-CABOT

. . . FOR PEAK PERFORMANCE AT MINIMUM OPERATING COSTS

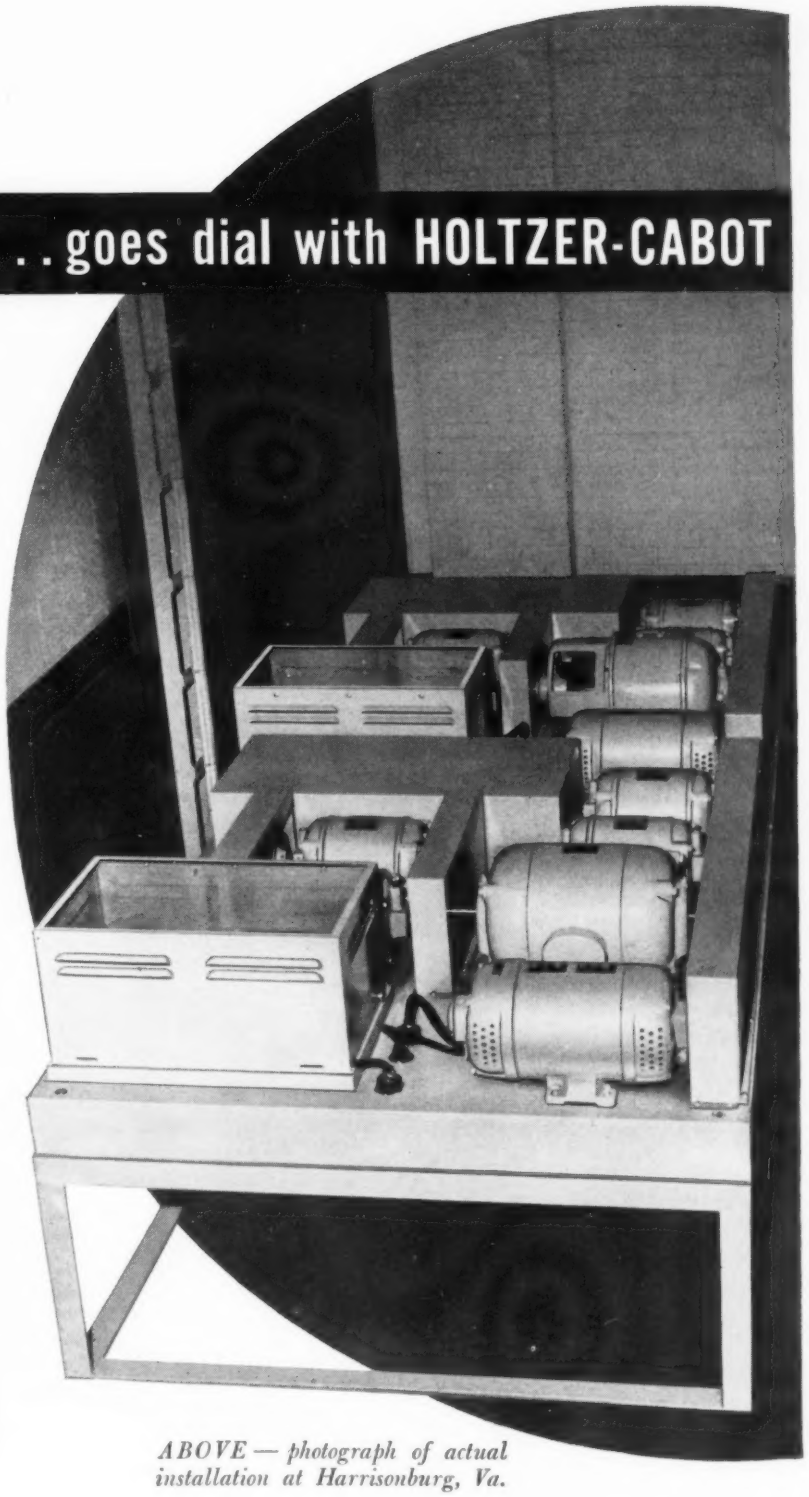
Harrisonburg, Virginia, now joins the long list of communities changing to dial with Holtzer-Cabot . . . because Holtzer-Cabot installations give years of efficient, trouble-free service with utmost economy.

In the Harrisonburg installation, two types of multi-frequency, harmonic ringing motor-generator sets are used: Type 5A100BH, which operates from 208 volts, 60 cycles, three phase, and Type 5D100BH, which operates from 48 volts, DC. Output of each generator is 100 watts at frequencies of 16⅔, 25, 33⅓, 50 and 66⅔ cycles per second. The unit also generates ½ ampere of direct current for coin control.

The tone alternator interrupter units produce approved dial tones of 500 cycles and 600/120 cycles for dial and busy tones. A 12 spring-pack nylon cam interrupter provides accurate timing.

Nylon cams in Holtzer-Cabot interrupter units provide more accurate timing than do ordinary assemblies, and last much longer. In laboratory tests, these nylon cams have been subjected to the equivalent of seven years' use, and there is still *no* sign of wear!

If you have an installation or maintenance problem — consult Holtzer-Cabot, a leader in the field of telephone equipment manufacture.



ABOVE — photograph of actual installation at Harrisonburg, Va.

NATIONAL PNEUMATIC CO., INC. AND **HOLTZER-CABOT** DIVISIONS

125 Amory St., Boston 19, Mass.
Sales Service Representatives in Principal Cities throughout the World

Designers and manufacturers of mechanical, pneumatic, hydraulic, electric and electronic equipment and systems

Holtzer-Cabot Telephone Equipment Division
National Pneumatic Co., Inc.
Boston 19, Massachusetts

Please send me complete data on Holtzer-Cabot tone alternator interrupter units and multi-frequency ringing machines.

NAME .....

TITLE .....

COMPANY .....

CITY .....ZONE....STATE .....

carrier. A simple method, which could be used on transmitted carrier systems would be to short circuit the carrier to represent a signal. In such a circuit, at the receiving end, a relay would always be held operated by the received carrier current. It should be noted here that the power in a received carrier signal, while adequate for voice transmission is usually insufficient to operate a relay. Therefore, a separate amplifier is used in the signalling portion of the circuit. This amplifier terminates in a rectifier which supplies dc to a relay as long as the ac from the carrier is being received.

In such a system, if the carrier stops the relay drops. Hence, the M lead at the transmitting end could be made to short circuit the one carrier channel (not the metallic pair) and drop the relay at the distant end. This relay would repeat the signal (dial pulse, seizure, etc.) over its own E lead to the terminating end of the trunk.

On systems which do not transmit the carrier, other methods are used. It will be remembered that most carrier systems have filters which will not pass voice frequencies higher than 2,800 or 3,000 cycles, and then only one sideband is sent.

It is possible to use some of the space between channels, such as the space which would have been used by the suppressed sideband, to carry signal information. With transmitted carrier systems, the same method can be used by making the spacing between channels wider.

One method of transmitting this information is the use of an alternating current of about 3,700 cycles. This current is generated by a vacuum tube oscillator. One such oscillator may serve several carrier channels. This 3,700-cycle current is turned off and on as required in the individual channel.

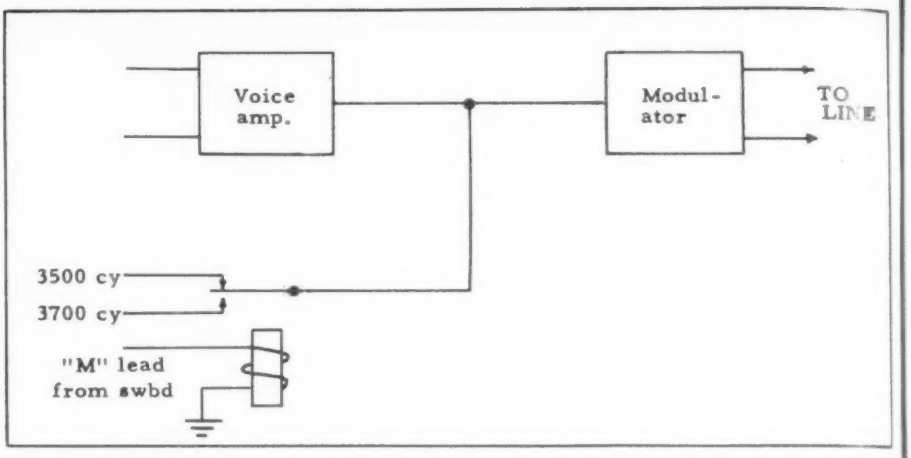


Fig. 14—Frequency-shift signalling. Battery on the "M" lead from the switchboard or other apparatus operates the relay when the circuit is seized. This changes the signal frequency from 3,500 cycles to 3,700 cycles, which is fed into the modulator and out on the line. At the receiving end a circuit recognizes this change and operates the distant relay.

In one system, a 3,700-cycle tone is transmitted alongside of each channel in the system while it is idle.

This tone is injected into the carrier just past the voice low pass filter. It travels right along with the voice, and is stepped up to carrier frequency in the modulator and sent over the system just as though it might be a higher pitched voice sound.

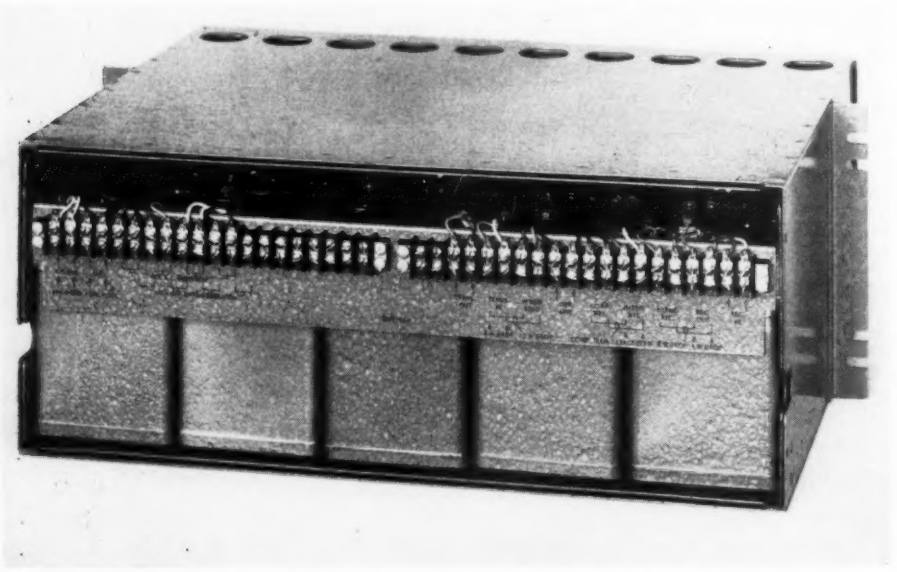
At the receiving end, special filters pick this tone out after the voice has been demodulated. One filter prevents it from entering the trunk circuit to the switchboard, while the other routes it to a separate amplifier where it is ultimately converted to dc to operate the trunk relay equipment.

In this system, the 3,700-cycle tone is stopped and the relay at the distant end released when signalling is finished and conversation begins. This eliminates the possibility of the tone cross-talking into the conversation.

Thus, the dc signal produced by the M lead at the transmitting location is converted to 3,700 cycles, then to carrier frequency, then back to 3,700 cycles, and ultimately becomes direct current again, on the E lead of the terminating end.

In some systems, where the signal equipment is furnished as a separate unit, rather than being built in to the speech equipment, the signal frequency is handled in its own special channel. The equipment may have its own modulator and amplifiers, and couple direct through filters to wire line. Equipment similar to this can be used to transmit teletype or telegraph messages as well as voice over carrier systems.

Another method used is frequency shift signalling. In these systems, the frequency transmitting the signal is not keyed off and on, but is shifted to a different frequency. At the receiving end, this shift is detected by a sharply tuned filter, which will transmit current at one frequency but not at the other. This feature can be made to ultimately operate a relay which will repeat the signal information being transmitted.



This channel equipment features screw rather than soldered terminals for cabling to other equipment. Cross-connects can be made on this terminal strip to provide for different types of signalling, power supply, hybrid connections, etc. (Photo courtesy Lynch Carrier Systems, Inc.)

Single- and Multi-Frequency

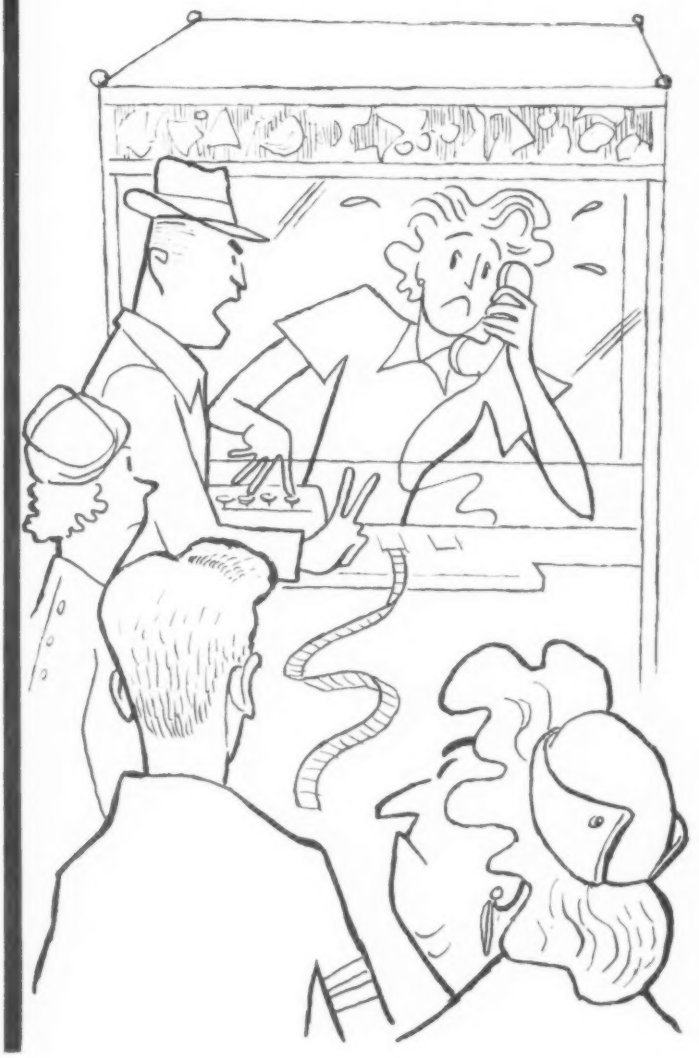
Among the other methods used to transmit signals is the single-frequency circuit. This involves the use of an alternating current which lies within the voice range of the carrier system. A frequency of about 1,600 cycles has been used extensively, but more recent equipment uses frequencies around 2,600 cycles.

With this method, the trunk relay equipment is made to transmit a tone of one of these frequencies right over the regular tip and ring voice channel

(Please turn to page 45)

This theatre is never . . .

snowed under with calls for program information!



In theatres and drive-ins, Peatrophone telephone-answering service is being enthusiastically accepted by theatre managers as the perfect solution to two of their most troublesome problems. Not only does Peatrophone leave their key personnel free for important duties during rush hours—but it also does an excellent public relations job, giving out program information that is accurate, clear, and packed with enthusiastic sell.

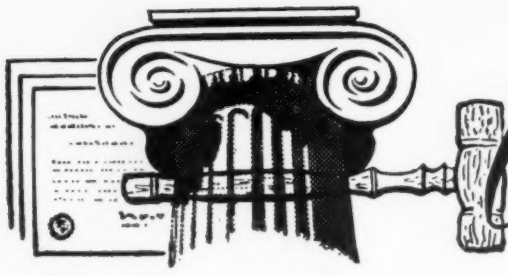
For the first time, theatre management can be certain that answers to calls for program information are delivered exactly in the form desired—*because the manager himself can record the story of each new program in a matter of minutes*—and the Peatrophone will answer every call, giving the 1000th caller the same courteous, enthusiastic answer as the first. One recording will cover an unlimited number of calls! Best of all, this wonderful service costs the theatre only a few cents a day on the phone bill.

Telephone companies who are handling this ingenious and helpful device, are finding Peatrophone's popularity rewarding — IN THE FORM OF A STEADY NEW SOURCE OF INCOME FOR THEIR COMPANIES.

Write today for complete information and literature on Peatrophone — your new source of revenue.

Note: Selective harmonic ringing subsets now available—all frequencies.

TELEPHONE ANSWERING & RECORDING CORP.
342 Madison Ave. New York 17, N. Y.



Courts and Commissions

Ohio Revises Procedure on Filing Telephone Maps

The Ohio Public Utilities Commission on Aug. 4 revised and brought up-to-date its telephone map-filing procedures for the first time since 1936.

Aimed at speeding settlement of subscribers' company and exchange boundary complaints, the order will be filed with the Secretary of State and have the effect of law 10 days thereafter.

The commission said one of the main purposes of the directive, known as Revised Session Order No. 48, is to obtain uniformity of all maps filed, so they could be put together in a mosaic to form a picture of any particular area.

The order also for the first time requires the telephone companies to file maps covering all exchanges, instead of total service areas. It was pointed out most companies follow this procedure, but the new requirement will ease settlement of exchange boundary disputes where there now are no such maps.

Another section of the order provides that companies may without commission approval revise the boundary lines between two exchanges or companies whenever no one would be adversely affected. The order requires that subscribers in the areas approve any territory switch.

A commission spokesman said this provision would speed settlement of boundary disputes when only a few customers are involved.

V V

Nebraska Independent Given Rate Raise

General rate increases were authorized for the Merriman (Neb.) Telephone Co. by the Nebraska Railway Commission, effective Aug. 1. Old net monthly rates and authorized increases are as follows:

	Old	*New*
One-party business (M)	$2.50	$4.50
One-party business (G)	2.50	4.50
One-party residence (G)	2.25	3.25
Two-party residence (G)	2.00	3.00
Switched station	1.25	1.25

The company does not employ a prompt-payment discount plan.

Estimated gross revenue under the new rates is $10,897 and expenses are $10,021. This results in a net profit of $876 per year.

Increased maintenance expense and increased taxes made it necessary for the company to ask for additional revenue.

The company serves 114 subscribers at Merriman.

V V

Schedule of Increased Rates OK'd for Virginia Company

Request for rate increases by the Clifton Forge-Waynesboro Telephone Co., Staunton, recently was granted by the Virginia Corporation Commission.

The old and new rates for residence service are: one-party, $3.50 to $4.00; two-party, $3.00 to $3.50; four-party, $2.50 to $3.00; and rural, $2.50 to $3.25.

For one-party business subscribers on the Waynesboro exchange, the rates increase from $5.75 to $7.00. On the Covington and Clifton Forge exchanges the increases are from $6.25 to $7.00 for business subscribers.

V V

Pennsylvania Commission OK's $4,000 Raise for Company

A $4,000 annual rate increase was put into effect recently by Bucks United Telephone Co., Harrisburg.

The Pennsylvania Public Utility Commission authorized the increase after study indicated the company needed a higher return to meet operating costs.

There were no protests to the new schedule.

The rate increase reportedly affected 197 subscribers.

V V

Missouri Commission Grants Rate Raise to Independent

The Missouri Public Service Commission recently granted Osage Valley Telephone Co., Osceola, the right to raise rates by $7,700 a year.

The company would then be earning a net return of 6½ per cent, or about $3,206 a year, the commission said.

Commission Turns Down Bell Rate Plea in New York

In unanimously rejecting a petition by the New York Telephone Co. to increase the monthly rates for telephone service in the state, the New York Public Service Commission held on Aug. 6 that the company's present earnings were sufficient.

During the six months to June 30, the commission found the company earned 5.91 per cent on invested capital. An expert engaged by the commission and one representing the federal government had testified that a return of 6 per cent or slightly more was sufficient for company needs.

Although conceding that the company's present return was slightly under 6 per cent, the commission observed that when the company's return was a shade over that figure it did not call for a reduction in rates. Conversely, when the return is a trifle below 6 per cent, the commission held, there is no warrant for changing a statewide rate structure to bring it up to the indicated amount. "It is not possible to fix rates with such a nicety," the commission said.

The company had asked increases amounting to $68,850,000.

The company contended it needed the extra income to meet rising costs and to attract capital for expansion to meet the public demand for high grade telephone service.

Financial experts brought in by the company had testified that to maintain a strong credit position and to enable the company to attract investment capital on the scale required it should have a rate of return within a range of 8 and 9.66 per cent.

The commission rejected a company proposal that the rate of return should be applied to a reproduction cost base. It also turned down a suggestion that investors in common stocks of the American Telephone & Telegraph Co., parent of New York Telephone, should be compensated for the loss of value of their invested dollars from inflation.

In its comment on the latter point, the commission set forth a principle that it indicated would have a con-

(Please turn to page 34)

men who know how to sell it, P-A-B-X offers unusually attrac- opportunities for new business. We've proved this in previous by showing you the facts on typical, well-paying installations. Now we're going to show you how we can help you *sell* P-A-B-X vice. We're offering you something different in sales plans—a nprehensive program sparkling with fresh ideas and new tech- ues based on proved effective principles. Our plan gives you sted system that covers every step in selling P-A-B-X, from ng your prospects to getting their signatures on P-A-B-X con- ts (after which you'll get quick delivery on stock switchboards). n handy kit form, our plan gives you everything you need to ry on a powerful, successful campaign. Examples are: top- ch, result-getting promotional literature to whet your prospects' erest, a survey system that helps you evaluate their needs cor- tly—even a sample proposal and contract so you'll have no uble with "paper work." And if you wish, our representative l be glad to work right with you.

f you're selling P-A-B-X service now—or would like to—you 't afford to be without Automatic's helpful new plan!

If you haven't received your sales kit, send for it today—then...

go out and bring in the business!

AUTOMATIC ELECTRIC

®

nators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

ers of Telephone, Signaling and Communication Apparatus • Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: AUTOMATIC ELECTRIC SALES CORPORATION
Export Distributors: International Automatic Electric Corporation
1033 West Van Buren Street, Chicago 7, U. S. A.

tinued bearing upon its findings in future rate cases. The commission said it found nothing in state law "which guarantees to the investor of utility equities insurance against the results of economic forces or even the political policies of any national administration."

In a separate statement, Keith S. McHugh, president of the New York Telephone Co., said the commission's denial of the company's request for increased rates is "bad news—in the long run as bad for telephone users as for the telephone company." He said the decision will be studied to determine what other steps are open to obtain the additional revenue the company must have to continue giving good telephone service—the kind the public wants.

"It would take an economic miracle," he declared, "to stretch rates that are so close to pre-war levels—up only 16 per cent since 1940—to cover the highest costs in our history and leave enough so that investors are treated fairly. Other successful businesses have had to meet this problem by raising prices. Consumer prices generally are up to 92 per cent.

"Since the war our expenses have been climbing at a faster rate than revenues. New construction costs have gone way up. To meet the public's demand for more and better service, we should continue to build 185 million dollars worth of telephone plant each year. Our annual rate of earnings is dropping steadily.

"Added efficiency and improved equipment have helped, but they simply don't save enough to offset rising costs. We need every penny we asked for.

"The telephone company has an obligation to the customers and the communities we serve. The only way we can give good service — growing and improving service—is to stay sound financially. The telephone customer is the ultimate loser if our earnings are held too low.

"We intend to do all we can to protect this company's financial safety."

V V

New Rates for Dial System OK'd For Indiana Company

The New Lisbon Telephone Co., operating exchanges at New Lisbon and Millville, recently was granted an increase in rates by the Indiana Public Service Commission (TELEPHONY, May 15, p. 30).

One-party residence rates at New Lisbon, which has a dial system, will be increased from $2.75 to $4.25. One-party business rates will be increased from $3.00 to $5.75 a month.

There was also an increase approved for Millville subscribers. The Millville increase is to continue until that exchange is converted to dial and then the rates for New Lisbon will be applied there.

V V

Two Minnesota Independents Secure Increased Rates

The Garvin Community Telephone Co. and the Valley Telephone Co., Browns Valley, were authorized on Aug. 3 by the Minnesota Railroad & Warehouse Commission to increase rates.

New rates for the Garvin company were expected to raise operating revenues to $4,330 from $3,491, and turn a deficit of $158 into a net profit of $534, a return of 5.62 per cent on a rate base of $9,500.

The following are the old and the new gross rates:

	*Old**	*New**
One-party business	$3.25	$4.00
One-party residence	2.25	3.00
Four-party residence	2.00	2.75
Rural multi-party (company-owned)	2.25	3.00
Switched station	1.25 Net	1.50 Net

*A discount of 25 cents will be allowed if paid on or before the 20th day of the month in which service is rendered.

The Garvin company serves approximately 95 stations.

In considering the Valley company's rate request, the commission noted that the company proposed to convert its exchange to dial operation in 1955. The commission approved an interim schedule of rates for manual operation to apply after a rehabilitation program has been completed. The same schedule of rates, with the elimination of the handset charge, the commission approved for use following conversion to dial.

The Valley company's operating revenues under the old rates were $17,691; under the new manual schedule will be $23,722, and after cut-over to dial, $22,612. Net income will rise from $961 to $3,636, and, with the dial system, to $5,691. Original cost of plant will be $60,859 following rehabilitation, and after conversion to dial, $99,727. The respective net returns will be 5.97 per cent and 5.71 per cent.

Approximately 375 local, 92 rural and 43 switched stations are served by the Valley company.

V V

Asks Rate Raise in Oklahoma

The Chouteau Telephone Co. recently asked the Oklahoma Corporation Commission for permission to raise rates and convert its exchange to dial.

Asks Idaho Court to Block Higher Telephone Rates

Idaho Attorney General Robert E. Smylie on July 26 asked the state supreme court to overrule a district court order enabling Mountain States Telephone & Telegraph Co. to collect payments from a higher rate schedule which twice has been rejected by the Idaho Public Utilities Commission (TELEPHONY, July 17, p. 34).

Smylie's motion was filed in Ada County District Court, where Judge Charles E. Winstead ruled last month that the company may continue to charge the higher sum because its present rates may be "confiscatory."

Smylie argued that Winstead had failed to consider the full record of the commission, which has ruled twice that the company has failed to prove the need for higher revenues.

The higher rates, which now are being impounded by order of the state supreme court, would raise the company's revenues by an estimated $1,097,000 a year.

Smylie said he expected the appeal would be heard some time in the fall.

A company appeal against the commission denial also is in the hands of the supreme court.

V V

Applies for Rate Raises In Nebraska

The Merriman Telephone Co. recently applied to the Nebraska Railway Commission for authority to increase its rates. Proposed increases in net rates are as follows:

	Present	*Requested*
One-party business (M and G)	$2.50	$4.50
One-party residence (G)	2.25	3.25
Two-party residence (G)	2.00	3.00

No increase in rates for rural service is asked.

V V

Schedule of Increased Rates Granted Alabama Company

The Elmore-Coosa Telephone Co., Eclectic, was authorized to increase rates recently by the Alabama Public Service Commission.

The commission granted the increase requested by the company, a schedule which will provide approximately $3,213 a year in additional revenue.

New business rates range from $4.25 for eight-party service to $6.75 for one-party. Residence rates run from $3.25 for eight-party service to $4.50 for one-party.

SIMPLE AND EFFICIENT—The ***Bell Solar Battery*** is made of thin, specially treated strips of silicon, an ingredient of common sand. Needs no fuel other than light. Should theoretically last indefinitely, since it has no moving parts and nothing is consumed.

New Bell Solar Battery Converts Sun's Rays Into Electricity

Bell Telephone Laboratories demonstrate new device for using power from the sun

Great and kindly is the sun. Each day it bathes the earth in light, bringing life to everything on earth.

Scientists have long reached for the secret of the sun. For they have known that it sends us nearly as much energy daily as is contained in all known reserves of coal, oil and uranium.

If this energy could be put to use there would be enough to turn every wheel and light every lamp that mankind would ever need.

Now the dream of the ages is closer to realization. For out of the Bell Telephone Laboratories has come the ***Bell Solar Battery*** — a device to convert energy from the sun directly and efficiently into usable amounts of electricity.

Though much development remains to be done, this new battery gives a glimpse of future progress in many fields. Its use with transistors (also invented at Bell Laboratories) offers far-reaching opportunities for improvements and economies in telephone service.

A small ***Bell Solar Battery*** has shown that it can send voices over telephone wires and operate low-power radio transmitters. Made to cover a square yard, it can deliver enough power from the sun to light an ordinary reading lamp.

Great benefits for telephone users and for all mankind will come from this forward step in harnessing the limitless power of the sun.

BELL TELEPHONE SYSTEM

Diamond State Company Seeks Rehearing of Rate Case

A petition was filed with the Delaware Supreme Court by the Diamond State Telephone Co. on Aug. 2, seeking reargument and reconsideration of the court's recent decision on telephone rates (TELEPHONY, Aug. 7, p. 30).

The high state court's 2-to-1 ruling upset a decision of the superior court, to which the company had appealed the rates fixed by the Delaware Public Service Commission.

If not changed as a result of the new petition, the high court's opinion will force rates lower than those being charged on the basis of the superior court decision.

The supreme court decision involves the company's rate base and the power of the superior court, rather than the commission, to make a valuation of the company's plant.

In its new petition, the company argued that the opinion of the majority of the state supreme court "has misconceived the company's argument in support of the rate base of 25½ million dollars found by the superior court."

As another ground for asking for reargument, Diamond State's petition said that by relating the company's established dividend to the problem of the rate base, "the majority of the court not only has attributed to the company an argument which it did not make, but has brought into this appeal the question of rate of return which was not an issue of this appeal and was not argued."

The company's petition also questions the finding of the majority of the supreme court that the superior court is without power to revise the findings of the commission. It then disputes the emphasis given by the majority of the court to the fact that the commission sees and hears the witnesses in a rate case.

V V

Florida Company Plans Sale of $300,000 Stock Issue

The North Florida Telephone Co. recently announced through its president, Otto Wettstein III, that 30,000 shares of the company's common stock would be offered to the public for sale at the $10 par value. Mr. Wettstein stated that the sale of this issue of stock had been approved by the Florida Securities Commission.

The purpose of the sale of common stock, according to Mr. Wettstein, is to meet the equity loan requirements of the REA. In December, 1953, Mr. Wettstein stated, the North Florida Telephone Co. applied to the REA for a $2,250,000 loan. This loan, he said, together with the moneys obtained through the sale of common stock, will be used to purchase the 10 north Florida exchanges of the Florida Telephone Corp., Ocala; convert all the manual exchanges to automatic dial.

The 10 exchanges are Alachua, Branford, Crescent City, Hastings, High Springs, Jasper, Lake Butler, Live Oak, Mayo, and White Springs.

V V

California Independent Seeks Rate Relief to Aid Expansion

The San Joaquin Telephone Co., Manteca, recently applied to the California Public Utilities Commission for an increase in rates. The company stated that its expansion and modernization program necessitated an added raise over the one authorized in January, 1953.

At the time of the last increase, the commission authorized a 6.25 per cent return on the company's investment.

Some of the rate increases asked are as follows:

	Present	*Proposed*
One-party residence	$3.50	$5.50
Four-party residence	2.50	4.00
One-party business	5.35	8.00

V V

New Mexico Company Asks First Rate Raise in 26 Years

The New Mexico Corporation Commission recently asked the Ruidoso Telephone Co., Carrizozo, for more information on its request for its first increase in rates in 26 years. The commission has taken the matter under advisement.

The company asked increases in the Capitan-Ruidoso area. It serves 457 subscribers.

Commissioner Ingram Pickett said the company already has installed dial systems in Ruidoso and soon will have them in Greentree and Hollywood. Dial service for Capitan is awaiting the arrival of new equipment.

V V

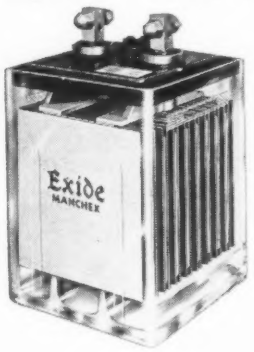
Merge Two Indiana Independents

The Indiana Public Service Commission recently granted authority to the Associated Telephone Co. to merge into Midwest Telephone, Inc., with headquarters at Petersburg.

Midwest serves Petersburg, Winslow, Otwell, Spurgeon, Union, Frichton, Hazleton and Decker as well as other communities in the area. The Associated company operates in communities south of Sullivan, extending into northern Knox County.

Construction
and
WITH THE DOUBL
STROMBERG-CARLSO
LEADIN

Exide-Manchex
telephone batteries



assure
positive operation

For Central Office
and Private Branch
Exchange Equipment

This is proven daily in exchanges of every s
. . . for over 60 years Exide Batteries have be
serving the Telephone Industry . . . the Ma
chester positive plate with its exclusive butt
type construction provides exceptionally lo
life . . . latest developments on molded gl
jars permit compact space saving installat
. . . heavy terminal posts with copper inse
provide extra conductivity for sustained v
age at high discharge rates . . . microporo
rubber along with slotted plastic separato
are impervious to chemical and electrical
actions . . . plastic spacers assure plate alig
ment . . . for assured dependability, long l
and low-cost maintenance use Exide Manch

The Electric Storage Battery C
Philadelphia, Pa.

1888 . . . Dependable Batteries
for 66 Years . . 19

materials
& Supplies

UARANTEE OF
ND AMERICA'S
ANUFACTURERS

reversible • weatherproof

reliable "RU" cable terminal

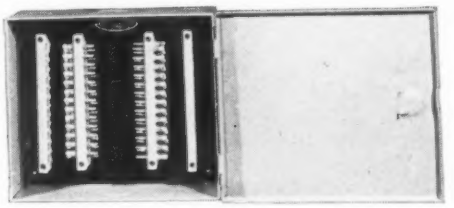
The results of Reliable's policy of endless research and testing of parts and materials, together with a rugged design simplicity are apparent in this Reversible, Unprotected Terminal.

The flat fanning face plate, in combination with a sturdy non-corrosive aluminum cover which surrounds the wires both front and back, creates an unusually weatherproof terminal.

The reversible sliding aluminum cover also permits stub to be mounted at either top or bottom.

Such other features as: detachable mounting bracket; aluminum alloy chamber; guide rings for jumpers; beveled washers; perfect sealing nozzle, etc. add greatly to the installation and service convenience of the Reliable "RU" Terminal, as well as providing an assurance of service life beyond actual field requirements. Ask for complete information on sizes and prices.

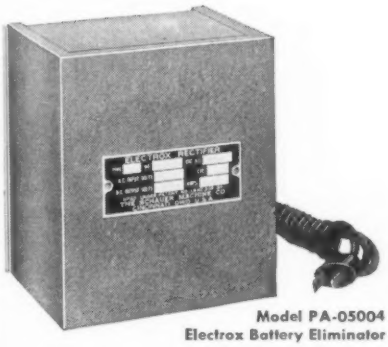
"Reliable" identifies the quality



cook type "57" interior terminal box

The type 57 interior terminal box is for distribution and termination of lead-covered or loom cable for low-voltage circuits. The box itself which has an Underwriters' Laboratory listing is constructed of smoothly enameled steel, with hinged cover and necessary knockouts. Fanning strips and terminal strips are provided as well as screw connectors on the drop sides and solder clips for cable wires.

24-hour guaranteed direct current, with electrox battery eliminator



Model PA-05004
Electrox Battery Eliminator

Designed specifically for the Operator's Circuit on Magneto Switchboards, the PA-05004 type illustrated guarantees current even if your AC fails!

When operating from 110 volt, 60 cycle lighting circuit, it delivers a constant, humless direct current. If the alternating current supply fails, a built-in Power-off Relay automatically transfers the operator's circuit to stand-by dry cells.

Other models available for Lamp Signal (PBX) and Automatic (PAX) systems. Products of Rectifier Division, Schauer Manufacturing Corp.

Distributed by

STROMBERG-CARLSON

ROCHESTER • CHICAGO • ATLANTA • KANSAS CITY • SAN FRANCISCO • TORONTO

High Fidelity Radios and Radio-Phonographs

Office Intercom Equipment

Electronic Carillons for Churches and Public Buildings

Sound and Public Address Systems

"Panoramic Vision" Television Receivers

AND MANY OTHER ELECTRONIC PRODUCTS FOR OUR ARMED FORCES

When power is interrupted—

Mobile ONAN Electric Plant Keeps Exchanges Operating

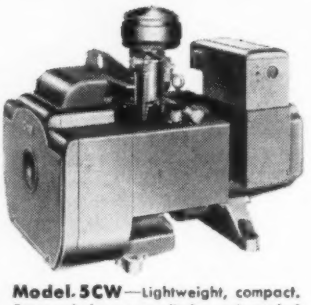
This trailer-mounted 25,000-watt Onan Electric Plant is one of a fleet of 20 owned by the Northwestern Bell Telephone Company in Minneapolis. These units are kept in a centrally-located garage and when an outlying exchange is cut off from its regular source of electric power, one of these mobile electric plants is rushed to the spot. Within a few minutes it is hooked up and all essential equipment supplied with electricity.

For mobile applications such as this, as well as in permanent standby installations, Onan units can be depended upon when emergencies strike. Onan heavy-duty, 4-cycle engines start easily, run longer without attention, require less maintenance.

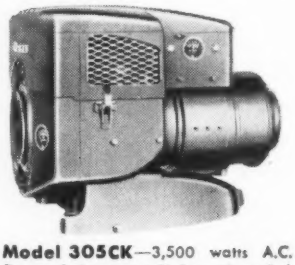
Onan Standby Plants are used by telephone, micro-wave and radio broadcasting companies from coast to coast to assure vital communications. If you have a standby power problem, let our engineers recommend the size and type electric plant you need.

ONAN STANDBY PLANTS: 1,000 to 50,000 watts A.C., gasoline-powered.

Write for Folder and Engineering Assistance



Model 5CW—Lightweight, compact. Powered by two-cylinder, air-cooled gasoline engine.



Model 305CK—3,500 watts A.C. Powered by two-cylinder, air-cooled gasoline engine.

D. W. ONAN & SONS INC.
7877 University Ave. S.E., Minneapolis 14, Minn.

Onan ELECTRIC PLANTS

STANDBY POWER for every need, 1,000 to 50,000 watts

IN THE NATION'S CAPITAL

Concluded from page 22

the radio broadcast ahead of the announcer's translation of the message. Morse code is a lost art these days in the communications business. But nowhere is its passing mourned more sentimentally than among old-time newspapermen.

* * *

The pretty telephone operator who finally got married and thought she had seen the last of her headset may be in for a surprise. The current issue of *American Magazine* has a picture story of a housewife who has solved the problem of how to do the telephone talking she wants and still get her housework done. This lady uses a headphone and a 15-foot extension, which enables her to chatter away while she irons, manicures, feeds the baby, etc. The headset leaves both hands free and the long cord permits walking around the room.

The only trouble is the man of the house with a wife "who likes to visit," and especially if he has a teen age daughter, will have to get a second telephone in self-defense. There should be an opportunity here for the telephone sales department if this fad ever gets going.

The Scripps-Howard newspapers last week carried a cartoon of a man telling his secretary, "Miss Peebles, wire my daughter to get off the phone, I want to talk to my wife!"

V V

New Mexico Commission Hears Request for Rate Raise

The request of the Chama-Arriba Telephone Co., Chama, for rate increases was heard recently by the state corporation commission.

Oswald Reeves owns the company, which operates at Chama, Parkview, Tierra Amaralla, Dulce and Lumberton. He said he serves 53 business and 87 residence subscribers.

Increases asked included: one-party business, from $5.50 to $7.50; one-party residence, from $4.00 to $5.00; multi-party residence, from $2.75 to $3.25.

Mr. Reeves told the commission he lost $2,237 in the year ended last Aug. 31 and another $130 in the next six months.

V V

Kentucky Co-op Asks Increase

The Foothills Rural Telephone Cooperative Corp., Salyersville, recently filed an application with the Kentucky Public Service Commission asking for

a schedule of increased rates. The cooperative said additional revenue was needed to construct and maintain a dial system.

V V

Oklahoma Purchases Considered By Southwestern Bell Company

Southwestern Bell Telephone Co. is considering purchase of 11 north central Oklahoma telephone exchanges, Ray C. Jones, Oklahoma Corporation Commissioner announced on Aug. 3. The commission must approve the contemplated purchase.

The exchanges, owned by the General Telephone Co. of the Southwest, which has headquarters in San Angelo, Tex., are located at Billings, Marland, Red Rock, Mulhall, Morrison, Glencoe, Ripley, Perkins, Coyle, Carney and Yale.

Mr. Jones said General also has a rate increase pending before the commission, but if the purchase is made by Southwestern Bell, the 11 towns would not be included in any rate raise.

The commissioner said further that Southwestern Bell would install dial systems in 10 of the towns now without them. Yale is the only one with a dial system at present.

H. B. Groh, recently named Oklahoma general manager for Southwestern Bell, said negotiations "are in the preliminary stages."

V V

One Minnesota Independent Buys Another

The Paul Bunyan Rural Telephone Assoc. purchased the Kelliher (Minn.) Telephone Exchange recently from Roy Aune.

In completing the transaction the Paul Bunyan company exercised an option on the Kelliher exchange which it held for four years while an REA loan was being negotiated.

V V

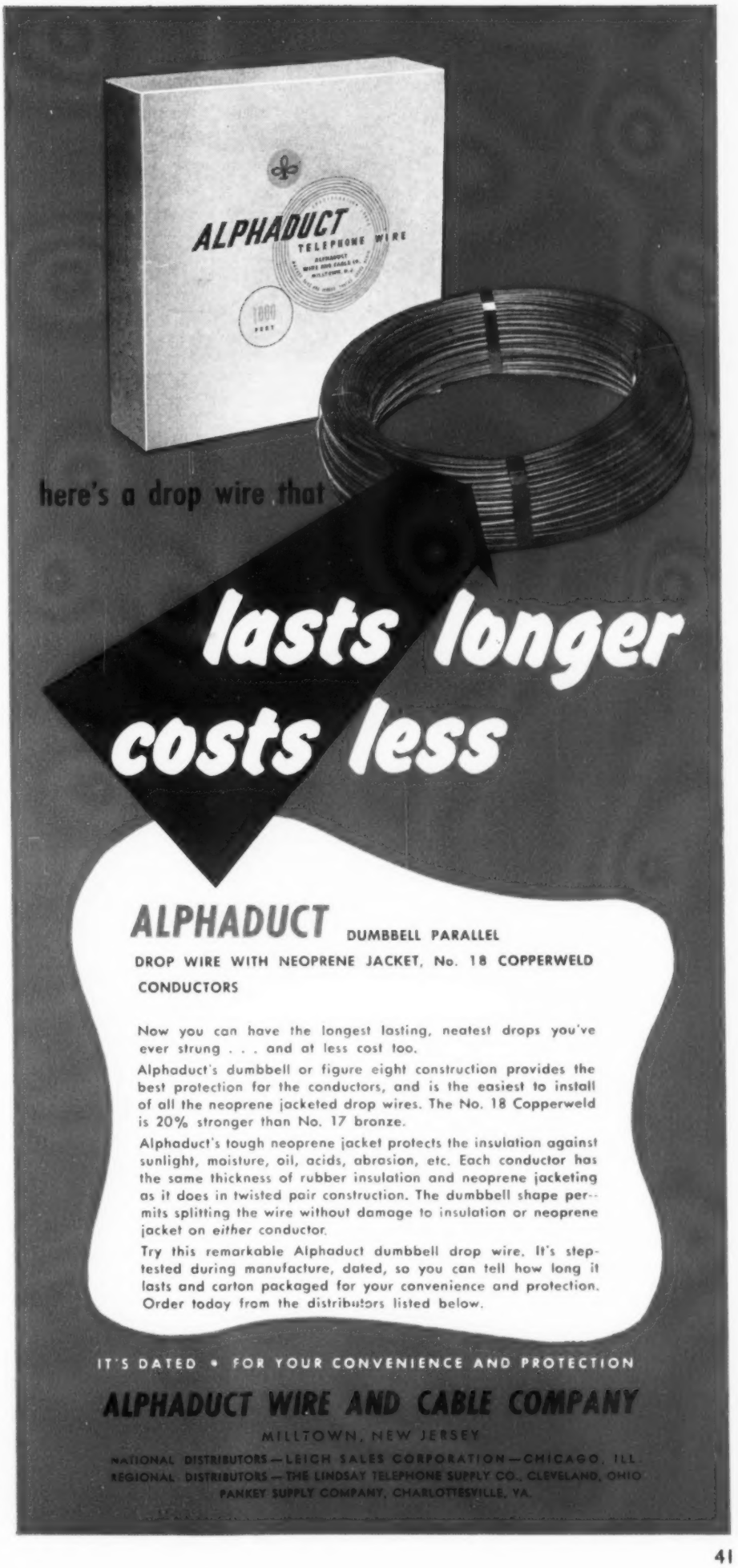
Asks Loan Approval in Vermont

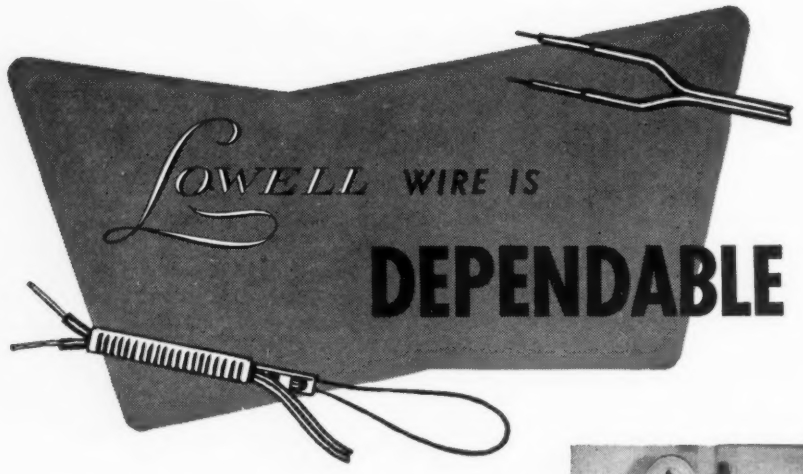
The Vermont Public Service Commission on July 27 was to have heard the petition of the Ludlow Telephone Co. to borrow $80,000 from the Chase National Bank of the City of New York. The loan would be used to finance extension and improvement of the company's plant.

V V

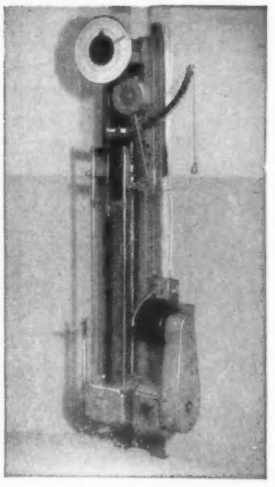
Kansas Company Granted Raise

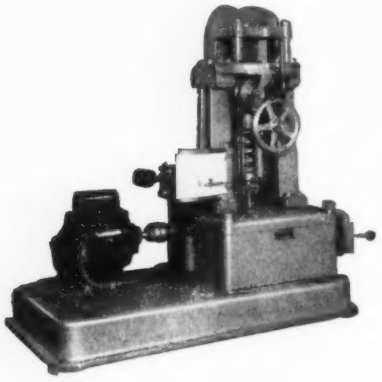
The Kansas Corporation Commission recently approved a $4,182 annual rate increase for the Miltonvale Telephone & Telegraph Co., which serves 476 customers. The company had asked for $5,478.

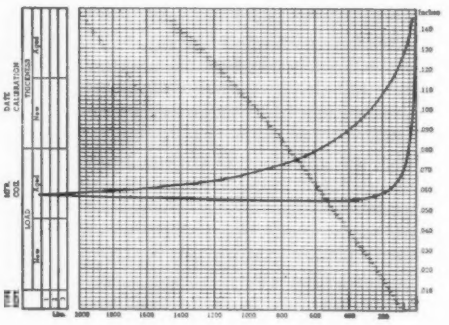

ALPHADUCT
TELEPHONE WIRE
here's a drop wire that
lasts longer
costs less
ALPHADUCT DUMBBELL PARALLEL
DROP WIRE WITH NEOPRENE JACKET, No. 18 COPPERWELD CONDUCTORS
Now you can have the longest lasting, neatest drops you've ever strung . . . and at less cost too.
Alphaduct's dumbbell or figure eight construction provides the best protection for the conductors, and is the easiest to install of all the neoprene jacketed drop wires. The No. 18 Copperweld is 20% stronger than No. 17 bronze.
Alphaduct's tough neoprene jacket protects the insulation against sunlight, moisture, oil, acids, abrasion, etc. Each conductor has the same thickness of rubber insulation and neoprene jacketing as it does in twisted pair construction. The dumbbell shape permits splitting the wire without damage to insulation or neoprene jacket on either conductor.
Try this remarkable Alphaduct dumbbell drop wire. It's step-tested during manufacture, dated, so you can tell how long it lasts and carton packaged for your convenience and protection. Order today from the distributors listed below.
IT'S DATED • FOR YOUR CONVENIENCE AND PROTECTION
ALPHADUCT WIRE AND CABLE COMPANY
MILLTOWN, NEW JERSEY
NATIONAL DISTRIBUTORS—LEICH SALES CORPORATION—CHICAGO, ILL.
REGIONAL DISTRIBUTORS—THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO
PANKEY SUPPLY COMPANY, CHARLOTTESVILLE, VA.



With labor and maintenance costs much higher today than some years ago, it is natural for telephone companies to insist on installing drop wire that will give long service. Dependability in Lowell's complete line of Telephone Wires is assured by a technical staff using many physical tests to determine the effect of heat, aging, tensile strength, compression, cold, acids, oils, moisture and abrasion. Tensile test machine at right which tests for adhesion enables us to guarantee that the adhesion bond between the insulation and conductor is stronger than the conductor itself.







Compression testing is essential in high grade insulated telephone wires. All Lowell parallel neoprene jacketed drop wire is tested in our laboratory to withstand pressure of 2000 lbs. or more before the insulation jackets are crushed. Since resistance to compression determines the quality of the adhesion these tests prove that Lowell Drop Wire will stand the crushing action of the P Clamp without cracking of the insulation or jacket, thus insuring dependability and long life in service.

"Fine Wires Only"

LOWELL INSULATED WIRE DIVISION
OF The Overlakes Corporation
171 LINCOLN STREET — LOWELL, MASSACHUSETTS

FUTURE OF TELEPHONY

Continued from page 19

friend seeking a career, because I thought it important for him to know that telephone management has never been satisfied with standing still. The entire life span of the business has been one of constantly looking forward, of determination to make better instrumentalities at lower cost, so that the user will get the best telephone service at the lowest cost. Looking back, it is good that this has been true—it has permitted the industry to grow greatly while at the same time keeping its prices within the reach of all.

Now all of this must have sounded pretty promising to my friend even though I tried to state it dispassionately and objectively. But—there is always a "but"—I believed it only fair to say that I thought the business had some hazards in it too.

I illustrated these by referring to the two hazards which were very real at the time I came into the business 35 years ago. Incidentally, I told him that in those days, the Bell System had nearly eight million telephones with 30 million calls a day; today it has over 40 million telephones with nearly 154 million calls a day. I told him that one of my friends warned me against going into the Bell System because it was then too big!

Two Threats 35 Years Ago

There were two things which threatened us most seriously in 1919. The first was the specter of government ownership and the second was concern that we could not survive great growth at inflated postwar costs.

I am glad to say that the specter of government ownership, which was very real in those days, seems more remote today than at any time in the last 35 years. It is to the credit of the industry and the job it has done for the American public that at no time even during the years of the most radical legislation—the 1930s—did any official to my knowledge seriously suggest that the government take over the telephone industry. If we continue giving the best in telephone service we should not have to meet a demand for nationalization in the foreseeable future.

Competition from government has been a little closer threat in recent years. Again I think our best defense is to do our service job so well that none will want government service or its precursor, government help.

But the other threat, the almost impossible problem of keeping earnings up during years of fast-rising prices

while at the same time raising enormous sums of capital to meet insatiable demands for service, was a problem after World War I. It has been infinitely more difficult after World War II.

I told my young friend something about the part that regulation plays in this problem. I said that many years ago there were two competing companies in most towns. Neither the companies nor the customers were very happy with this arrangement.

The problem was solved by legislation permitting a single telephone company in a community. But in lieu of competition, the legislature quite properly insisted that the service and rates of the single company should be regulated by a public authority.

This legislation meant then and means now we must all face the fact that the future of the industry will be critically affected by the statesmanship and breadth of vision of those who are appointed to regulate our companies—they have such very great power to help or harm our industry.

Faith in the Future

Personally, I have great faith for the long run in the vision and sound judgment of our regulators and in the wisdom of those who appoint them to office. That faith is based on a lifetime of experience in the business during which I have seen the standards of regulation steadily improve and the stature and courage of the men in these important posts steadily increase. That faith is founded also on the simplest of all beliefs—that if we give good service in a pleasing manner to all in our state, if we are good citizens in the communities we serve, if we are forward-looking and progressive—the telephone industry need not be apprehensive of regulation. This I believe. I feel it so deeply that if I were starting again fresh out of college, I would go directly to a telephone company and try for a job.

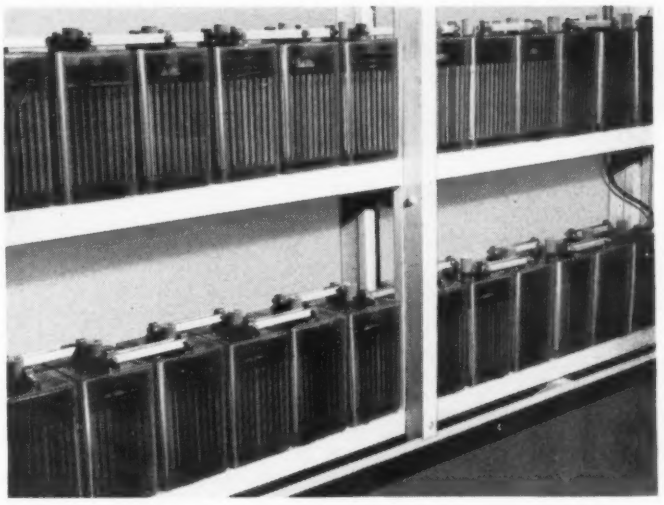
For this is a very great industry in which we are associated so closely.

There is a high quality of personal satisfaction which goes with rendering vital communications services to all the people, in seeing that their simple daily needs or their personal or business emergencies are met with equal swiftness and courtesy.

There is a deep satisfaction in being a telephone employe, spending one's business life working with telephone people for a common purpose.

This great industry will continue to grow and to serve. It has a bright future despite its pressing problems. I wish, like my young friend, I could begin all over again.

At Oregon-Washington Telephone Co.



The Oregon-Washington Telephone Co. is proud of their newest installation of C&D Batteries at the Hood River, Oregon plant. The 24 PlastiCal cells, Type PCE-540, have a 540 A. H. capacity.

It's C&D Batteries for EXTRA life

For many years to come, the C&D PlastiCal batteries at Hood River, Oregon, will provide continuous, dependable service. Here, in the heart of the world's most famous apple country, the Oregon-Washington Telephone Co. has found that C&D has the answer to telephone battery needs.

When you order your next telephone battery, specify C&D. For with C&D, you get:

1. **One-piece, permanently-sealed plastic case. Entire unit is shock-resistant and lighter and more compact than glass or rubber.**
2. **Elimination of sudden leaks due to internal stresses.**
3. **Easier maintenance, because patented Post Seal eliminates acid creepage.**
4. **Lower shipping costs. Light plastic case reduces total in-place cost.**

You can order C&D Batteries from your equipment supplier.

C&D

Write for Bulletins!

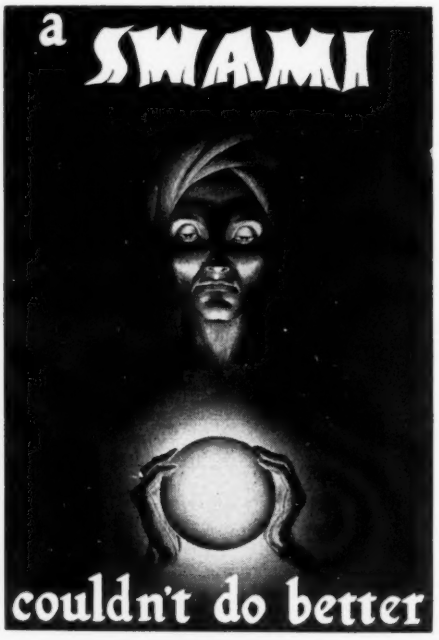
For details and specifications on C&D telephone batteries, write for Bulletins T-527, T-528.

BATTERIES, INC.

of Conshohocken, Pa.

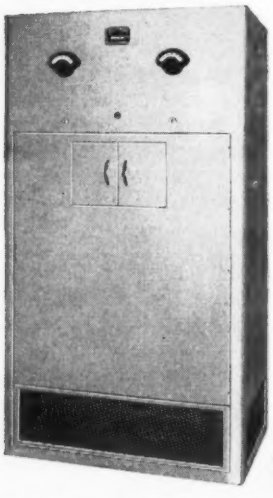
Manufacturers of Industrial Batteries since 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST



FLOTROL

SENSES THE NEED FOR CURRENT



Model 10KB

AND SUPPLIES IT!

It's almost unbelievable, the way the FLOTROL output keeps up with the load current—keeps your batteries fully charged—keeps your exchange voltage right on the dot. What's more, it does all this without the use of any moving parts, vacuum tubes, marginal relays, or the like.

If you're planning to replace or add to your charging facilities, don't overlook FLOTROL'S many advantages. Write for Bulletin 160 for complete information on single phase models, from 1/2 ampere to 24 amperes, Bulletin 161 describes three-phase models from 25 amperes to 200 amperes.

LORAIN PRODUCTS CORPORATION
1122 F STREET LORAIN, OHIO

FLOTROL PARTNERS IN DEPENDABILITY SUB-CYCLE

Texas Independent Granted Council-Approved Increase

Clifton (Tex.) Telephone Co. recently was granted authority by the Clifton City Council to increase its rates, effective Aug. 1.

The city council received an agreement from the company to make certain improvements in plant in Clifton.

The new and old rates are as follows:

Business, one-party: Old rate $4.00, new rate $5.50; two-party, old rate $3.00, new, $4.00.

Residence, one-party: Old rate $3.00, new, $3.50; two-party, old rate $2.50, new, $3.00; four-party, old rate $2.00, new, $2.50.

Rural (company-maintained lines): Business, old rate $4.50, new, $5.50; residence, old rate $2.50, new, $3.00.

V V

OBITUARY

RALPH E. MARBURGER, 59, of Columbus, O., former vice president and general manager of Ohio Bell Telephone Co.'s southwest area, died on July 25 from a heart attack. Mr. Marburger's career with Ohio Bell dates back to 1912, when the company was known as the Central Union Telephone Co. He left in 1922 to attend Ohio State University, then re-joined the company, after graduation, as an attorney.

In 1931 he became vice president in charge of public relations and in 1937 was transferred to Columbus as vice president and general manager of the southwest area. He left that position in 1944 to become a member of the law firm of Bricker, Marburger, Evatt & Barton, which position he held at the time of his death.

Surviving are his widow, Marthena; his mother, Mrs. Nora Marburger, of Columbus; three sisters, Mrs. John R. Slocum and Mrs. Edgar Lamb, both of Columbus, and Mrs. Edwin Pierce of Hamilton, O., and two brothers, Bertrand and J. Arthur, both of Columbus.

V V

South Carolina Cooperative Announces Two Acquisitions

The Horry Telephone Co-operative has acquired the Coastal Telephone Co., Loris, S. C., and some rural stations in the Conway exchange area of the South Carolina Continental Telephone Co., Sumter, S. C., George Bell, co-op manager, announced recently.

This was the final transaction in setting the stage for the cooperative's overall program in Horry and Georgetown counties, he stated.

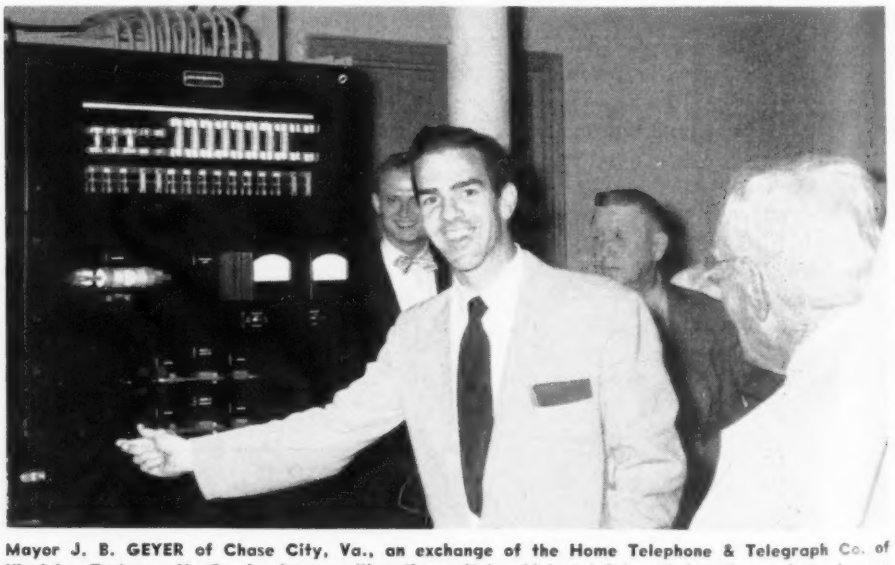
V V

Buys Nebraska Independent

Announcement was recently made of the sale of the Bancroft (Neb.) Telephone Co. to K. M. Deer of Hill, Minn. The former owner and manager was Fred Wuellner.

V V

"Laws and institutions are constantly tending to gravitate. Like clocks, they must be occasionally cleaned, and wound up, and set to true time."—HENRY WARD BEECHER.



Mayor J. B. GEYER of Chase City, Va., an exchange of the Home Telephone & Telegraph Co. of Virginia, Tarboro, N. C., is shown pulling the switch which cut into service the exchange's new automatic equipment with the 2-5 numbering arrangement, necessary to participate in nationwide operator toll dialing. Cost of the new dial equipment, toll switchboard, new brick central office building and outside plant approximated $300,000. Company officials report the capacity of the new central office is about double that of the old exchange. For several months prior to the cut-over, publicity was released through various media to inform subscribers of the changes and improvements due upon conversion. Particular emphasis was placed on informing subscribers of the 2-5 numbering plan and of its increasing importance to them as more and more offices throughout the country become part of the nationwide operator toll dialing network.

CARRIER SYSTEMS

Continued from page 28

into the carrier. No special equipment is required within the carrier for this, as these tones are the same as voice frequencies. The necessary switching of the tone is done in the external trunk circuit equipment.

While these tones could be heard by listening on the system, they are used only in setting up the call, and like the shorted carrier system described above, do not interfere with the conversation because it will not have started until the signalling is complete.

While the single frequency will not interfere with the conversation, the latter may interfere with the signalling. This is because the human voice contains the frequencies used for signalling, and in ordinary conversation a speaker may strike just the right note to actuate the signal equipment. It is for this reason that the higher frequency mentioned above is being used in later apparatus, because the human voice carries less power at this frequency, and is less likely to operate relays.

The single frequency system is used extensively for dial pulsing and is used successfully on long circuits. However, the nationwide toll dialing plan will probably see an increase in the use of multi-frequency transmission over carrier systems.

With multi-frequency, a toll operator sends forward a call by depressing the numbers on a key set in her position. Each key sends out a combination of different semi-musical tones, which lie in the carrier voice range. These are transmitted to the distant end, and are repeated and amplified along the way just as voice frequencies would be. The equipment at the distant end contains tuned circuits which recognize each tone and operate relays which correspond to the keys pressed by the operator.

This system requires no special signalling equipment in the carrier, because the tones travel over the voice path. However, a signal circuit is usually provided in the carrier anyway, to take care of switchhook supervision.

The foregoing material has presented the required theory and the basic components found in simple three or four-channel low frequency carrier equipment, minus many of the refinements which are found in working apparatus.

In actual application, carrier systems frequently require equipment other than that described above. Changing climatic conditions can affect transmission along the line on which a carrier travels. This has made necessary the

self-bonding insulating tape

Throughout the signaling and communications fields, more and more companies are depending on BI-SEAL for maximum protection against moisture and weathering. BI-SEAL is also preferred for its ease of application—a characteristic that is inherent in its composition.

BI-SEAL makes efficient wire and cable splices because

BI-SEAL is self-bonding. When applied, it fuses into a solid mass that creates a tight permanent seal over the splice. Because of its elasticity and mechanical strength, Bi-Seal molds itself into a perfectly conformed sheath over the most complex shape.

MAKES SPLICING EASIER, QUICKER. With no sticky adhesives, Bi-Seal is easier to apply in close clearances. There is no right or wrong side and no tacky surface to pick up foreign matter or stick together during application.

LOW TEMPERATURE CHARACTERISTICS. Bi-Seal retains its flexibility at temperatures as low as minus 67°F. This property facilitates application and provides perfect performance even under extreme weather conditions.

MOISTURE RESISTANT. Polyethylene, the basic material used in the formulation of Bi-Seal, is a strong barrier to water permeability and is virtually non-absorbent. The layers of the tape become so tightly fused that it is impossible to delaminate them. This provides a watertight seal and the tape tension developed on the wire or cable jacket insures against any lateral moisture penetration.

HIGH DIELECTRIC STRENGTH. Bi-Seal has an average dielectric strength of more than 1000 volts per mil of thickness.

WEATHER RESISTANT. Properly applied, Bi-Seal lasts as long as the wire and cable insulation itself in outdoor installations.

CAN BE STORED INDEFINITELY. Bi-Seal will not deteriorate nor deform even after years of storage.

Detailed information on splicing procedures available on request.

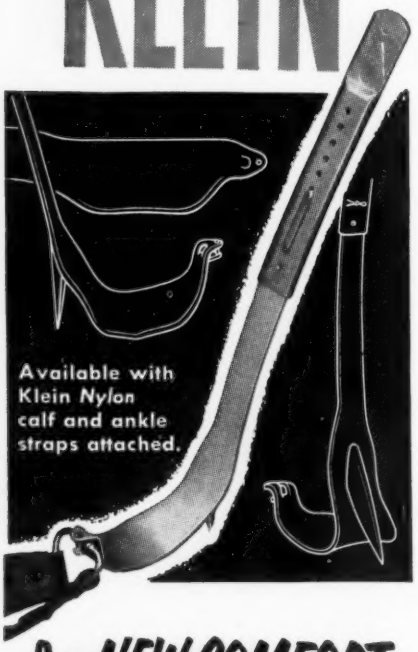
APPLIES FAST · STAYS FAST
BI-SEAL

BISHOP MANUFACTURING CORPORATION

12 CANFIELD ROAD, CEDAR GROVE, NEW JERSEY

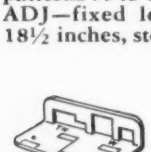
Look to the Leader

KLEIN



for NEW COMFORT ...NEW SAFETY

Meet the big new favorite—Klein Climbers fully shaped to the contour of calf and ankle. That means a firmer, closer fit . . . a greater measure of safety. There's a new shape to the extra-wide stirrups also, for more comfortable arch support. Klein Climbers are made of forged steel, individually tempered and tested—aluminized for weather protection. Matched in pairs—adjustable length patterns 15 to 18 inches, specify 1945-ADJ—fixed length patterns 15 to 18½ inches, stock sizes specify 1945.



KG NO. 1 GAFF GAUGE
Keep this precision gauge handy for a safety check on proper spur shape. Plated steel—packed in durable plastic case.

1901-MG GAFF GUARDS
Protect the all-important spur of your climbers with this new Klein gaff guard. First quality leather with spring clip.

Instructions for sharpening gaff included.

ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York.

Write for your free copy of the Klein Pocket Tool Guide today!

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
3200 BELMONT AVE., CHICAGO 18, ILL.

use of regulating equipment. Noise conditions have made necessary the use of compressors and expandors.

The theory of operation of these devices, and some specialized applications, such as subscriber line carrier, will be discussed in a subsequent article.

V V

AT&T Completes Biggest Inland Submarine Telephone Cable

The Long Lines Department of American Telephone & Telegraph Co. announced completion today of the biggest inland submarine telephone cable project ever undertaken in this country.

The cable system, consisting of three cables each 3 miles in length, crosses the Hudson River between Nyack and Tarrytown, N. Y. Although the entire job took two years to complete, the sinking of each cable took but one day. Splicing of the cables to land lines on either side of the Hudson has been going on for eight months.

The underwater cables are part of a new communications route extending from Newark, N. J., through White Plains, N. Y., to West Haven, Conn. Much of the route still is under construction, including a new long distance switching center at White Plains.

The intricate network of facilities, with White Plains as the hub, is expected to be in full operation by November. It will permit long distance calls to and from New York state and the New England states to bypass New York City.

Long Lines said the first of the long distance circuits went into service over the submarine section today.

V V

Illinois Commission Approves Raise, Orders Improvements

The Illinois Commerce Commission on Aug. 4 granted Industry Telephone Co. a $9,500 annual rate increase.

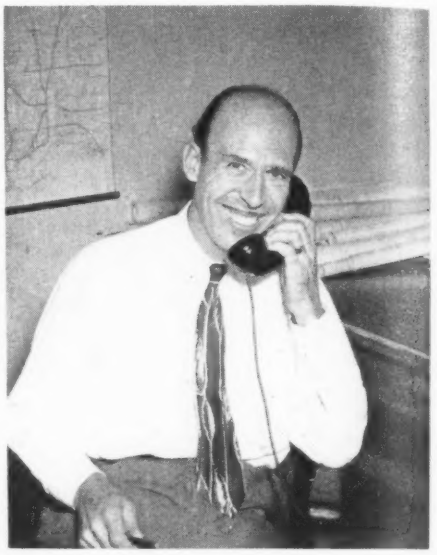
The commission ordered the company to rebuild, metallicize and deload its lines as quickly as possible.

V V

"The democratic character of the ownership of modern corporations is often overlooked. Anyone, regardless of race, creed, or national origin, can freely participate in such ownership upon the purchase of a single share of stock. Yet, many apparently still believe that the privilege of stock ownership is restricted in some manner. A broader base for the ownership of American industry will do much toward a better understanding of our economic system."—*Excerpt from 1953 annual report, Pacific Gas & Electric Co.*

General of Kentucky Announces Personnel Changes

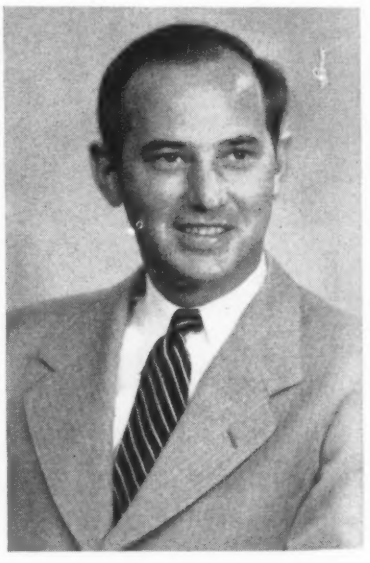
The General Telephone Co. of Kentucky, Lexington, Ky., recently announced that Bernard LeBaron, the company's vice president and chief engineer, has resigned, effective Aug. 1,



BERNARD LeBARON

to accept a special assignment position with the General Telephone Co. of California. Mr. LeBaron will be located at Santa Monica, Cal.

The company named Roger L. Lyons to the post of chief engineer. Mr. Lyons is a graduate of the University



R. L. LYONS

of Kentucky with a B.S. in electrical engineering. He has been with General of Kentucky since 1939 in various capacities.

B. D. Robertson was appointed general plant superintendent. He started with the General company in Kentucky

B. D. ROBERTSON

in 1940 as a central office apprentice and most recently was general equipment superintendent.

V V

Safety on the Job Is Theme of New Council Employe Leaflets

"Accident Preventers"—the National Safety Council's new employe training leaflets—are packed with illustrations and sound tips on how to stay safe on the job.

Using few words but plenty of colorful cartoons, the preventers teach safety to today's worker who is accustomed to the fast visual presentation of television and the picture magazines.

Here is a pocket-size library of safe principles and practices on lifting, housekeeping, clothing and hand tools which can be used in many ways. They may be distributed at safety meetings, passed out by foremen, enclosed in pay envelopes, or made available for pick-up at the time clock.

For sample copies and quantity prices write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

V V

Illinois Bell Relocation Costs Hit Hard by Inflation

The August, 1954, miniature newspaper of the Illinois Bell Telephone Co., *Telebriefs*, which accompanies subscriber bills, on the subject of inflation, had the following to say:

"Inflation has tossed Illinois Bell a half-million-dollar curve.

"Back in 1946, work was started on Chicago's Congress Street Superhighway to link the Loop with the city's western suburbs.

"Illinois Bell's cost of moving telephone facilities, relocating service, and maintaining communications during the mammoth construction job was estimated at $812,000.

"But in 1954—eight years after the project began—here's what has happened to that estimate.

"Underground conduit has jumped from $1.29 per foot to $1.85. The foot of cable that cost $1.71 in 1946 costs $2.58 today. Bricklayers worked for $2.25 an hour then, but now they are paid $3.65 an hour.

"Costs have jumped all along the line, from 40 to 80 per cent.

"When the estimates were first made, no one knew how far the inflation spiral would rise but now, Illinois Bell must add to the $812,000 estimate an item titled 'Inflation—$500,000'."

V V

Texas Independent Gains Approval of New Rates

The San Marcos (Tex.) City Council recently approved a new schedule of rates for the San Marcos Telephone Co. (TELEPHONY, June 12, p. 48).

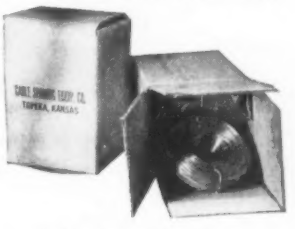
New rates range from $7.50 for one-party business service to $5.00 for four-party business service. Residence rates are $4.50 for one-party service and $3.00 for four-party.

Rx for Double-Purpose Jobs

Here's the Neale Model K Pull Type Spinner—engineered for versatility. It's doing a great job on electric power lines . . . and telephone lines, too! Model K has a maximum capacity of three 2" O.D. cables, and will spin single cable as small as 5/8" O.D. This spinner may be used with either one or two coils of spinning wire, so you may have either a 13" spiral or wire 6½" apart. Model K is furnished with two LC5 Lashing Wire Clamps, tow rope, cable placing dolly, and chest.

Contact your jobber

Use Neale Wire For Best Results

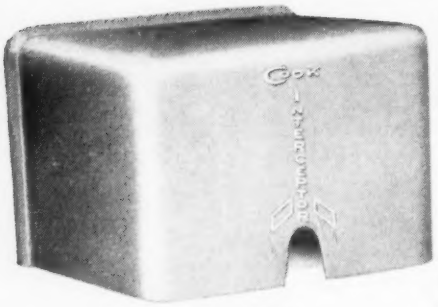


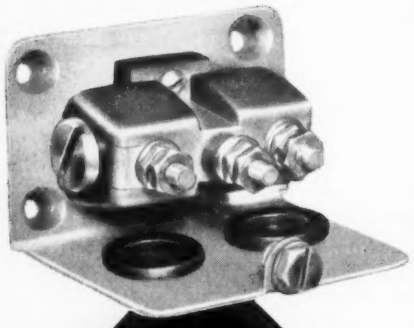
Available in 7 different types. There's just the wire for your particular requirements.

THE WORLD IS SPINNING—TOO! PHONE 2-7234-5

Cable Spinning Equipment Co.

3100 TOPEKA AVE. TOPEKA, KANSAS





Simplified
PROTECTION
with the new self clearing
MINIGAP
cartridge type arresters

The new Interceptor is designed for static drain, lightning and power surge protection.

Sealed MINIGAPS are screw mounted in bakelite with ground stud and bussed circuits insert moulded. The protector unit is enclosed in all metal corrosive resistant housing with grometted bracket.

Intercepter Part No. 501-150
Minigap Part No. 41-350

COOK ELECTRIC Company

2700 Southport Avenue
Chicago 14, Illinois

helpful LITERATURE

NEW PABX SERVICE BROCHURE—Automatic Electric Co. is offering a new eight-page brochure for mailing by telephone companies to PABX prospects. Titled, "Looking for a Way to Get Things Done?", it uses a series of realistic photographs and conversational captions to show subscriber companies how PABX relieves clogged switchboards, gets information fast, relays instructions, helps get goods made and shipped, and saves time, walking and waiting. It explains PABX in a clear, easy-to-understand manner and prepares the subscriber for a follow-up call by the telephone company.

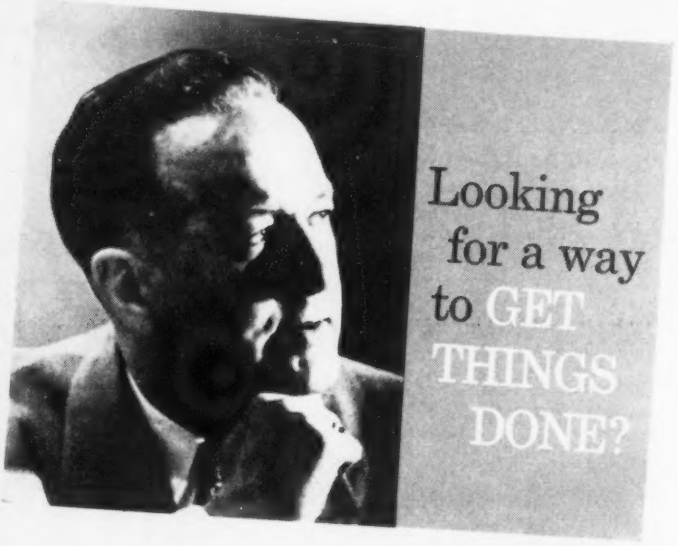
The new brochure is one of many practical sales aids included in Automatic's new "PABX Sales Promotion Kit." Request HL 198.

• • •

BATTERIES—C & D Batteries, Inc. has just released its specification bulletins CP-536 and CP-537 covering its complete line of lead-calcium and lead-antimony batteries for control, switchgear, and auxiliary power applications. The specifications include data on battery ratings and capacities, details of design and construction, dimensions, weights, and types of containers. Request HL 199.

• • •

C & D Batteries, Inc. also has made



TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation further information on the products described in the following numbers:

HL198 ____ ; HL199 ____ ; HL200 ____ ; HL201 ____ ; HL202 ____ ;
HL203 ____ ; HL204 ____ ; HL205 ____ ; HL206 ____ .

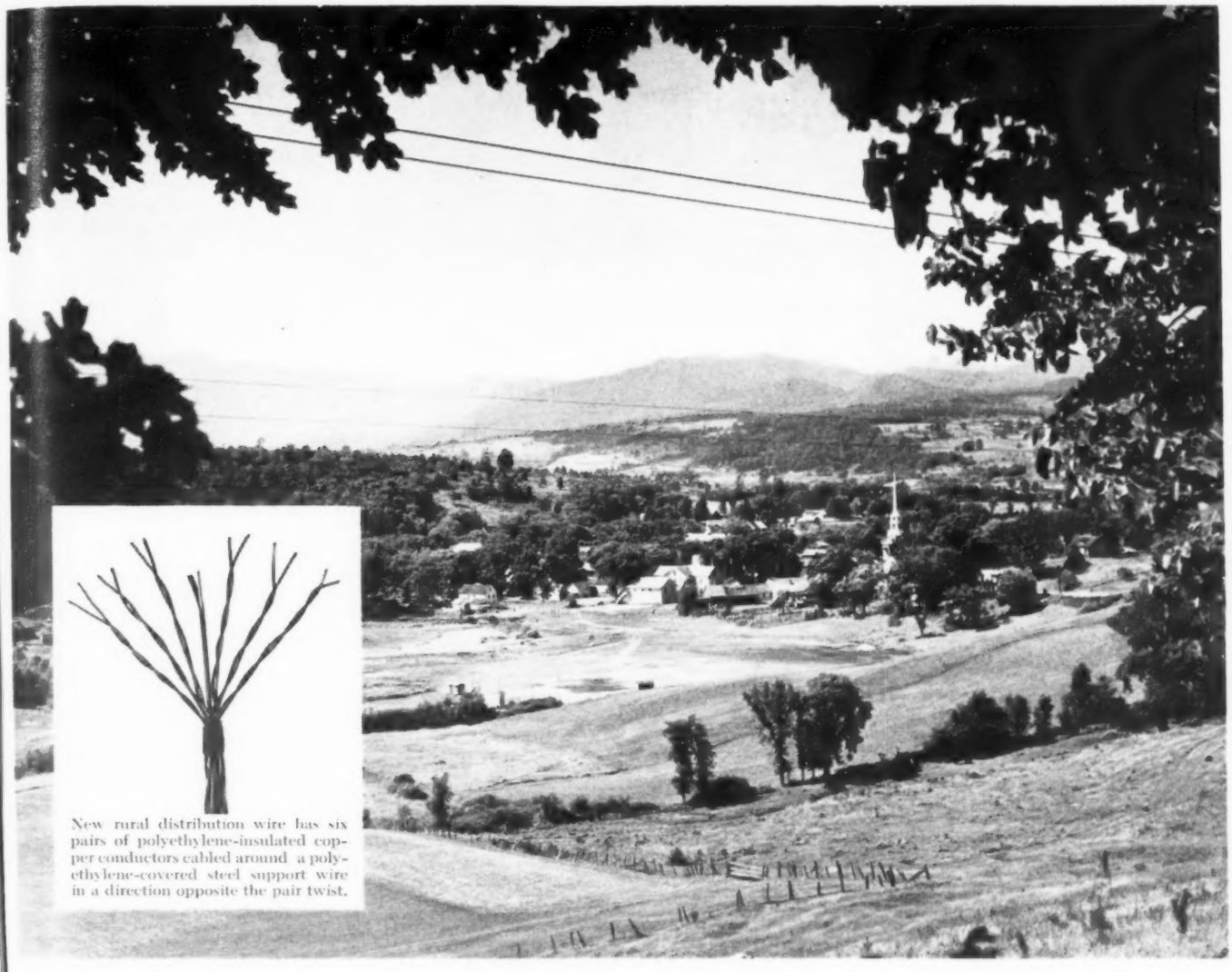
Name ..... Title .....

Company .....

Street .....

Town and State .....

8/14/54



New rural distribution wire has six pairs of polyethylene-insulated copper conductors cabled around a polyethylene-covered steel support wire in a direction opposite the pair twist.

NEW RURAL DISTRIBUTION WIRE
LOWERS COST OF INSTALLATION AND MAINTENANCE

Telephone circuits in many farm areas can now be increased without adding crossarms or rebuilding pole facilities. The solution is this new rural distribution wire developed by Bell Laboratories, its conductors and support wire separately insulated with polyethylene plastic. The new wire can be strung below the existing crossarms now carrying open wires.

The polyethylene insulation is the same as that used for cable sheathing, specially formulated for long outdoor life. The excellent electrical properties of polyethylene qualify it for such insulating jobs as this. Since solid polyethylene is extruded with utmost uniformity, capacitance unbalance is minimized. The material is used as a cushion on the support wire, in addition to providing electrical breakdown strength between the conductor insulation and the steel wire.

These are some of the reasons why BAKELITE *Polyethylene is being used so widely for wire and cable covering. Its extremely light weight helps make wire easy to handle and hang. It resists corrosive atmospheres, oil, grease, most strong acids and alkalies. Used for cable sheathing, it has shown no fatigue due to wind swaying.*

For more information on BAKELITE *Polyethylene for improved wire and cable construction, write Dept. YG-83.*

BAKELITE
TRADE-MARK
Polyethylene
FOR WIRE COVERING

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* 30 East 42nd Street, New York 17, N.Y.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario

Streamlined production techniques,
OCT-O-DUCT conduit add up to . . .

More Trench Feet per Shift in New 30-Mile Underground System

Thirty miles of 4-way and 6-way underground conduit in a single stretch south of San Jose, Calif., may be a record in itself. But contractors on the job agree that plenty of duct erection records were set. One crew laid 1600 trench-feet of 4-way duct structure in one working day —with only a regular 3-man erection team.

Well conceived specification by the utility, good planning by the contractors involved, and superior features of the new OCT-O-DUCT combined to make this record installation. The field-engineered features of the new flat-sided conduit proved out in this system which involved over 700,000 feet of duct.

If you are not using OCT-O-DUCT on your underground duct jobs you may not be getting the best circuit protection your money can buy.

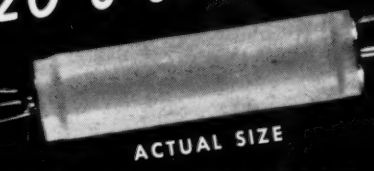
New Installation Manual

A brand new OCT-O-DUCT Installation Manual is available for the asking. This incorporates much of the experience on the 30-mile system described here, plus the best of the know-how of electric and telephone utilities, municipal and industrial users of Soapstone conduits over the past quarter-century. Send for a copy today. Write:

SOAPSTONE DUCT COMPANY

110 Linfield Drive, Menlo Park, California

NOW.. A RELAY 20 G UP TO 2000 CPS



ACTUAL SIZE

Limited quantity of model shop samples available — submit your specifications and requirements with your inquiry.

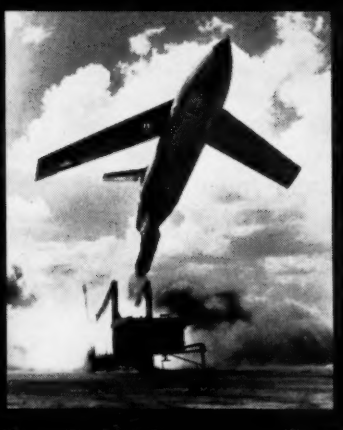


PHOTO
Martin Matador, courtesy
The Glenn L. Martin Company

DIMENSIONS:
15/32" diam. x 1 3/4" long

WEIGHT:
less than 1 oz.

OPERATING POWER:
100 MW Max.

CONTACTS:
spdt—2 amp. at 24 V DC
Resistive load

VIBRATION RESISTANCE:
20 G up to 2000 CPS
(cycles per sec.)

RELAYS

Wheelock SIGNAL
ENGINEERING & MFG. CO.
LONG BRANCH, NEW JERSEY

available a booklet, entitled "The Lead Calcium Battery," which contains a paper presented at the June 26, 1952 summer convention of American Institute of Electrical Engineers, by J. E. Rittenhouse and H. E. Jensen. The paper provides some of the history leading to the development of the lead calcium battery and compares it with the conventional lead antimony cell from which it developed. Request HL 200.

• • •

ELECTRIC PLANT—Over 200 models and specifications of both air cooled and water cooled gas-gasoline electric plants, ranging in size from 300 watts to 5,500 watts, are described and illustrated in a new booklet recently released by United States Motors Corp.

The booklet provides general information about all U. S. Motors light and power equipment together with guide information about selecting the proper type, size and starting methods plus the normal watt requirements of conventional appliances and motors.

The booklet contains both detailed and general specifications on all models from portables up to 5,500-watt emergency power plants. Request HL 201.

• • •

RELAY SYMPOSIUM—With a demand far exceeding the printing of papers from the First Oklahoma A&M Relay Symposium of June 1953, Potter & Brumfield has released a new volume of papers from the Second Relay Symposium held at Oklahoma A&M early this year.

Like its predecessor all papers are presented exactly as given at the symposium—no attempt has been made to edit or arrange them in any specific sequence. The new volume is available without charge to engineering, manufacturing, purchasing, teaching and student personnel. Request HL 202.

• • •

POWER PLANTS — Katolight Corp. has available a new bulletin—LP 354—generally describing its new standard line of power plants.

The brochure describes the portable, 3,600 rpm, manually starting models in sizes of 650, 1350, 2000 watts. Also, an 1,800 rpm series driven with air cooled engines in sizes from 500 watts through 5,000 watts. This series is available with electric start and stop, remote and full automatic controls utilizing generator cranking windings.

Larger units to 50,000 watts are shown with both air and water cooled engines showing a series of 1,200 rpm as well as 1,800 rpm speeds. The brochure describes each individual unit in consid-

erable detail along with ratings, general features and accessories. Request HL 203.

• • •

BAKELITE—Recent property and fabrication data on Bakelite fluorothene resins is compiled in a new 16-page booklet published by Bakelite Co., a division of Union Carbide & Carbon Corp. Much information on the new, high heat-resistant resins, now in commercial production after five years of process development, is contained in the booklet.

"Bakelite Fluorothene Resins—Properties, Forms, Fabrication" presents a digest of the latest information about these resins in graphs, tables and text. Their high softening temperature, resistance to burning, chemical inertness, weathering and moisture resistance, electrical characteristics, and good low temperature properties indicate a wide usefulness to industry.

Recommendations on extrusion, injection and compression molding of Bakelite fluorothene resins are included in a section on fabrication for the engineer and manufacturer. Applications of the versatile resins include monofilaments for the textile industry, extruded insulation for wires and cables, and numerous molded products where advantage can be taken of the outstanding properties of these resins. Request HL 204.

WOOD PRESERVATIVE—Barrett Division of Allied Chemical & Dye Corp. has released a reprint of an article entitled "The Exudation of Oil Type Preservatives From Treated Wood," printed in the February issue of *Journal of Forests Products Research Society*.

The article is by P. B. Mayfield, technical consultant of the Barrett Division, and it discusses 35 factors affecting exudation of oil type preservatives. In each case, a possible method of reducing exudation is given. Request HL 205.

• • •

ELECTRIC TYPEWRITERS—Impartial surveys of electric versus manual typing conducted by the Connecticut State Budget Division and the United States Air Force Military Air Transport Service have revealed that the use of electric typewriters has increased work output for the Connecticut agency by 30.2 per cent and resulted in what was six days output in five for the Military Air Transport Service.

With the Remington electric typewriter used exclusively in both tests, the Connecticut survey showed a production of 41.65 more lines per hour, with cleaner copy, and more efficient handling of much larger carbon packs.

In the air force comparison of electric versus manual typing, the results showed a savings of $514 per year for each typing station, and an increased production in some instances as high as 135.5 per cent.

Detailed findings of the two typing studies, together with statistics and other pertinent data on electric versus manual typing are covered in a new 6-page folder—RE 3678. Request HL 266.

V V

Methods are the masters of masters. —TALLEYRAND.

Charles Dyson and Associates Buy Hubbard & Co.

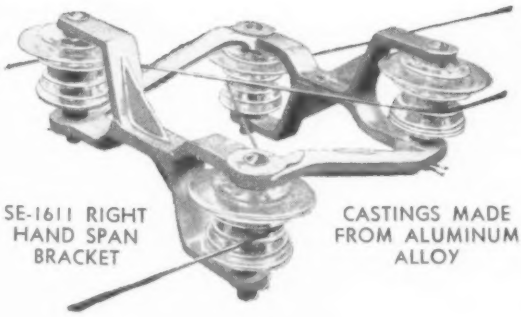
Charles Dyson and associates on July 20 announced the purchase of all the outstanding stock of Hubbard & Company. This 111-year-old Pittsburgh company is a leading producer of pole line hardware, aluminum street lighting standards and brackets for public utilities, and railroad track tools and track accessories.

Electrical materials plants of the company are located in Pittsburgh, Chicago, and Oakland, Cal. The company also is the parent concern for Sand's Level & Tool Co. of Clinton,

Get

IN CASE* YOU ~~WANT~~

A REAL MONEY SAVER!



SE-1611 RIGHT HAND SPAN BRACKET

CASTINGS MADE FROM ALUMINUM ALLOY

YOU GET ECONOMY

CASE* span brackets help you save on the number of poles in new line construction and in reconstruction; long spans are possible.

YOU GET QUALITY

Fabricated from lightest of all structural metals; equipped with Hemingray glass insulators; eliminate cross talk; easy to install.

SOLD BY LEADING DISTRIBUTORS IN THE UNITED STATES

Also available

CASE ALUMINUM TRANSPOSITION POINT BRACKETS

CANADA: N. Slater & Company Ltd., Sydney St., Hamilton, Ontario

ORDER FROM YOUR DISTRIBUTOR

TRANSANDEAN ASSOCIATES, Inc.

P.O. BOX 214, ORANGE, N. J.

Consulting Engineers and Constructors

Red-"d" to Serve You with Established Quality Wire··

BACKED BY ONE POLICY

A FAIR PRICE!

® Trade Mark Reg., Copyright 1953 by Diamond Wire & Cable Co.

● "AT YOUR SERVICE"... more than mere words when you team up with the big Red-"d". Here's established quality Telephone Wire. Here's fast service that means your telephone supply jobber will meet your installation schedules. And behind it all stands one policy . . . a fair price!

New 1954 Catalogs are now available at your Telephone Supply Jobbers.

Trade Mark

DIAMOND WIRE & CABLE CO.
SYCAMORE, ILLINOIS
Manufacturers of Red-"d" Electrical Wire

Ind.; Hubbard Aluminum Products Co. of Pittsburgh; Beall Tool Division of East Alton, Ill., and Unit Rail Anchor Co. of Chicago.

Hubbard & Company will continue to be independently operated. Mr. Dyson stated that James H. Knowles, president, will continue in that capacity and become chief executive officer of the company. Joseph V. Smith, chairman of the board of directors and an executive in the Hubbard company for nearly 40 years, will retire. Mr. Dyson will become chairman of the board.

V V

Stromberg-Carlson to Handle "Gai-Phone" Sales

The Stromberg-Carlson Co. has been appointed the national sales agent for the "Gai-Phone," new electronic telephone designed for noise-free communication in extremely noisy areas. The "Gai-Phone" is the product of Gai-Tronics Corp., of Reading, Pa.

Announcement of the appointment was made by T. C. Thompson, sales manager of the telephone division of the Stromberg-Carlson Co.

The "Gai-Phone" enables the user to carry on a clear telephone conversation,

Gai-Phone housed in Stromberg-Carlson "1500" desk-type instrument.

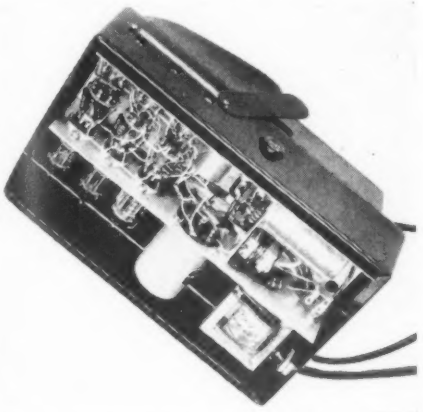
even in an extremely noisy location, without a noise-proof booth or other enclosure.

This is achieved by a special dynamic transmitter, which combines high quality voice transmission with a high order of discrimination against background noise. The "Gai-Phone" provides control over both incoming (receiver), and outgoing (transmitter) volume, as well as adjustable suppression of "sidetone." Concealed controls on the side of the instrument can be regulated by the installer for the most effective operation in each specific location.

Since the maximum output of the "Gai-Phone" is no greater than that of the conventional telephone, it can be used wherever such a telephone would

be used, and can be mixed with conventional telephones in the same system. Operation is exactly the same as a standard telephone. Each "Gai-Phone" requires a 110-volt, 60-cycle electric power connection.

The "Gai-Phone" employs a standard Stromberg-Carlson 1500 instrument, equipped with a special transmitter, electronic amplifiers, sidetone suppression and other auxiliary equipment. It is available for either desk or wall mounting.



Electric component housed in base of Gai-Phone.

Under the sales agreement "Gai-Phone" sales will be handled by Stromberg-Carlson's telephone division.

V V

National Carbon Co. Names W. H. Feathers Vice President

A. S. Johnson, president of National Carbon Co., a division of Union Carbide and Carbon Corp., recently announced that William H. Feathers has been appointed vice president and general manager of the company's industrial products.

W. H. FEATHERS

Mr. Feathers joined National Carbon after graduating from Virginia Polytechnic Institute in 1937 with a B.S.

HUBEYE BOLTS, EYES, AND NUTS

The large-radius rounded section of the HUBEYE prevents excessive localized strain on the guy, and the smoothly-rounded high sidewalls prevent concentrated strain on individual strands.

HUBEYE popularity has led to its standardization for all Hubbard attachments where time, money and maintenance are saved by elimination of the thimble.

The drop-forged eye is stronger than the rod section from which it is formed. All HUBEYE items are protected against corrosion by Hubbard Double-Dip Hot Galvanizing.

"Hang the load on Hubbard Hardware!"

OVERHEAD

Cable Suspension Material—Wireholders Pole Seats and Balconies—Clevises Braces—Drive Hooks—Messenger Dead Ends—Extension Arms—Long Span Material—Pins—Clamps—Guards—Stubbing Bands—Guy Protectors—Guy Clamps Pole Struts—Clips—Straps—Hangers Carriage Bolts—Rings—Transposition Brackets—Eye Bolts—Pole, Corner and House Brackets—Guy Hooks—Strain Plates—Storm Guy Straps—Lags—Machine and Hubeye Bolts—Sidewalk Guys REA Telephone Hardware

UNDERGROUND

Cable Racks—Manhole Ladders and Steps Pulling-in Irons—Expanding Anchors Cable Shields—Screw Steelwing Anchors Anchor Rods—Ground Rods and Clamps

HUBBARD AND COMPANY

ESTABLISHED 1843

PITTSBURGH • CHICAGO • OAKLAND, CALIFORNIA

degree in Chemical Engineering. Five years later he was named head of the company's works laboratory at Niagara Falls. Successively he was assistant superintendent of the company's plants at Columbia, Tenn., St. Louis, Buffalo and Fostoria.

In 1949, after a special assignment to a foreign electrode plant, he was made general superintendent of National Carbon's three Niagara plants; and in 1952 he was transferred to Cleveland as assistant vice president in charge of production.

V V

General Electric Appoints J. D. Helm a Sales Manager

The appointment of James D. Helm as sales manager for mobile communication equipment and special accounts was announced recently by the General Electric Co.

With his headquarters at Electronics Park, Syracuse, N. Y., Mr. Helm will direct the national sales of G-E two-way radio equipment.

The announcement was made by L. Robert Sheeley, manager of sales for General Electric communication products.

Mr. Helm is a native of Cortland, N. Y., and attended Colgate and Ohio State universities.

He joined General Electric in 1943 and held several accounting positions in Schenectady, N. Y., and Syracuse. In 1945, he was appointed a sales engineer for communication equipment and in 1951, sales manager for special industrial accounts.

In May of this year he was appointed sales manager of special accounts.

Focal point in the reception room of the new Leich Sales Corp. offices in Chicago is this Leich dial system. It's more than just an exhibit, for it is used to furnish PABX service for the entire Leich office.

SERIES OF BOOKS ON

Foremanship and Supervision

by HARRY C. WALKER, Ph.D., *Plant Training Supervisor*
SOUTHERN BELL TELEPHONE AND TELEGRAPH CO.

In these three books Dr. Walker gives us the fruit of a quarter century of experience as a craftsman, foreman, engineer, supervisor, conference leader and teacher in industry. Written in simple, straightforward English they have been recognized as outstanding manuals for training foremen and supervisors.

★ **ORAL EXPRESSION IN SUPERVISION** is designed to aid the foreman in making talks to his men, leading conferences, teaching industrial subjects and holding interviews. $1.00 each.

★ **THE FUNCTIONAL ELEMENT IN SUPERVISION** is a basic analysis of the foreman's duties. $1.00 each.

★ **THE HUMAN ELEMENT IN SUPERVISION** is an application of the principals of personnel counselling to foremanship. $1.00 each.

TELEPHONY PUBLISHING CORP.
608 SOUTH DEARBORN STREET CHICAGO 5, ILL.

The General Electric Co. also recently announced the appointment of Neal F. Harmon as southwestern regional manager for communication equipment with offices at 3200 Maple Ave., Dallas, Tex.

In his new position, Mr. Harmon will direct the sale of GE two-way radio, microwave, and carrier current equipment in the states of Texas, Arkansas, Louisiana, Mississippi, Oklahoma, and the southeastern half of New Mexico.

A native of Dumas, Ark., Mr. Harmon is a graduate of Hendrix College (BA degree) and the University of Arkansas (BSEE degree).

Mr. Harmon joined the General Electric Co. in 1930. Just previous to his most recent promotion, he was sales manager of two-way radio equipment with his headquarters at Syracuse.

In recognition of his active participation in civil defense, Mr. Harmon received the Charles A. Coffin award in 1953. This is the highest honor given by General Electric to its employes for outstanding achievements beyond their normal line of work.

V V

C. J. Helmholtz Appointed Onan Sales Engineer

Hiram Hascall, general sales manager of D. W. Onan & Sons Inc., Minneapolis, Minn., manufacturer of elec-

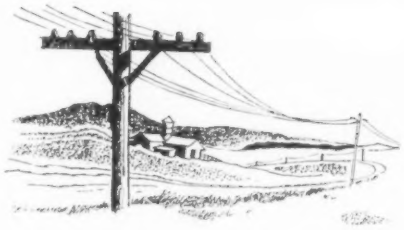
C. J. HELMHOLTZ

tric generating plants, has announced the appointment of Charles J. Helmholtz, Boston (West Medford), Mass., as direct factory sales engineer covering the New England states.

Mr. Helmholtz, formerly manager of dealer sales division, Boston branch, Fairbanks-Morse & Co., has been active in sales work throughout his career. He had been associated with Fairbanks-Morse Co. for over 34 years.

Headquarters for Mr. Helmholtz will

LONG LIFE



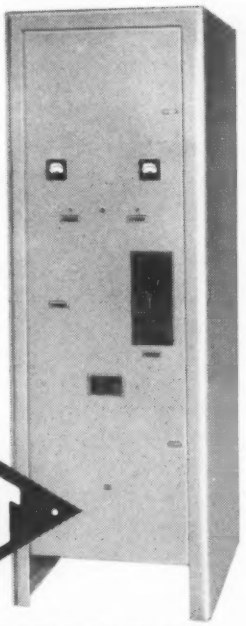
Winter or summer, in blizzard or in blistering sun, Armstrong's Glass Insulators give long, dependable service. Their tough industrial glass is at home in any climate. And they stand up under loads that will bend standard metal mounting pins. See your supplier or write Armstrong Cork Company, Glass and Closure Division, 295 Fifth Avenue, New York 16, New York.

ARMSTRONG'S GLASS INSULATORS
for communications . . . for power

Cut overhead costs –

Increase Battery Life with

INET



"TELE-CHARGERS"

FINEST **AUTOMATIC REGULATED** *TELEPHONE BATTERY CHARGERS...*

PROVEN "IN SERVICE"...

INET Tele-Chargers are engineered to surpass critical requirements of the Telephone Industry.

Featuring Permanent Magnet Reference . . . finest magnetic amplifier controls and long-life selenium rectifiers provide the ultimate in dependable *automatic regulation* and maintenance-free performance.

Fully protected and conservatively rated—*cannot* be overloaded—exceptionally close voltage regulation—better than ± ¼% regardless of extreme AC line, wide load and frequency changes and variations in ambient temperature. Other outstanding characteristics are: Lightning-Fast Response—better than 0.1 second and Low Ripple—less than 0.5% RMS.

Compact, completely self-contained with all controls, circuit breakers and separate float and equalizer controls housed in modern heavy gauge steel cabinets. Units available with output ratings of 49 to 65 VDC at 0-50 to 0-1600 Amps.; 23 to 27 cells.

Write for complete engineering specifications.

INET

DIVISION OF LEACH CORPORATION
4441 Santa Fe Avenue, Los Angeles 58, Calif.
Phone LOgan 8-4771

ENDURPRENE
• DROP • BRIDLE
A COMBINATION HARD TO BEAT FOR LONG-RUN ECONOMY AND RELIABILITY
PREMIUM GRADE INSULATION — TOUGH, ENDURING NEOPRENE JACKET
DISTRIBUTED BY KELLOGG SWITCHBOARD AND SUPPLY COMPANY
MANUFACTURED BY
GENERAL INSULATED WIRE WORKS, INC. PROVIDENCE, R. I.

be in West Medford, Mass., but he will spend the majority of his time working directly with Onan distributors and dealers in the field.

V V

G. G. Hoit of Stromberg Elected A Vice President of AMA

Gordon G. Hoit, of Rochester, N. Y., was elected vice president of the finance division of the American Management Association (AMA) at the group's annual meeting in New York

G. G. HOIT

recently. Mr. Hoit is a director and executive vice president of Stromberg-Carlson Co.

A member of the association for the past 10 years, Mr. Hoit spent one year as a member of the financial council of the organization.

He recently conducted the first financial seminar on the West Coast under the auspices of the management group.

Mr. Hoit is also a member and past president of the National Association of Cost Accountants and a member of the Controllers Institute of America.

The 18,000-member business-educational association (AMA) also elected three other new divisional vice presidents and 11 directors at a business meeting in New York.

V V

Superior Cable Begins Production in New Plant

Superior Cable Corp. of Hickory, N. C., has begun production of many types of communications cable, it was announced recently by H. G. Burd, president of the firm.

Manufacturing plant and general offices are housed in an entirely new building containing production and testing equipment of the most efficient and modern design. Several high rank-

DEVELOPMENT & FIELD SYSTEMS ENGINEERS

- EQUIPMENT
- CENTRAL OFFICE
- OUTSIDE PLANT
- TERMINAL
- TELETYPE
- POWER

With a progressive, expanding, well established corporation. Interviews will be arranged for qualified applicants. Send complete biographical resumé, experience and education to

MR. J. E. RICHARDSON
Personnel Director

MARYLAND ELECTRONIC MFG. CORP.
5009 CALVERT ROAD
COLLEGE PARK 6, MARYLAND

Type S-1-A
Frequency Modulated
Subscriber Carrier

We are as proud of this tag

As we are of our carrier!

NOW SHIPPING!
$1180. per Channel

McELROY
MANUFACTURING COR
Littleton, Massachusetts, U.S.A.

The manufacturing plant and general offices of the Superior Cable Corp. are housed in this new building at Hickory, N. C.

ing consulting engineers assisted in the selection and design of equipment.

Research and development work is being conducted jointly with leading colleges and universities, as well as in the laboratory at the plant.

All plastic telephone cables up to and including 404 pairs will be made, in some cases incorporating novel and improved designs. Quadded cables will be produced in addition to regular types and unit types. Production is in full swing on the six-pair No. 19 self-supporting rural distribution cable, Mr. Burd stated.

In addition to Mr. Burd, the staff of Superior Cable Corp. includes J. L. Robb, Gordon C. Rollins and B. E. Nordhielm. The sales manager and sales engineers have not yet been appointed.

Mr. Burd, an engineering graduate of Cornell University in 1909 (ME-EE), started in the wire and cable business in 1910 with the Standard Underground Cable Co. of Pittsburgh and Perth Amboy, N. J. (now a part of General Cable Corp.) and was involved with the production and installation of telephone cable at that early date. Subsequently, he was with the National Conduit & Cable Co. (which in 1923 became part of Anaconda), and more recently (1949-1952) with the Ansonia Electrical Co. as vice president.

Mr. Robb, graduate of George Washington University in engineering, was associated with the New York Telephone Co. He then served in the Coast Guard in communication work during World War II, and then became a regional engineer for the Rural Electrification Administration in Washington, D. C. With Superior Cable, Mr. Robb is directing engineering, testing and cable design work.

Mr. Rollins, engineering graduate of Purdue University and an ex-marine, formerly with Whitney-Blake Co. of New Haven, Conn., is plant manager.

Mr. Nordhielm, engineering graduate of University of Illinois and ex-navy officer of World War II, an experienced machine design and operating engineer with United Merchants & Manufacturers, Inc., is mechanical and electrical superintendent.

V V

Montreal and Quebec Television Stations Linked by Bell

A new microwave radio relay link began relaying television programs from Montreal to Quebec City's new station CFCM-TV on July 31.

Bell Telephone Co. of Canada, which constructed and operates the Montreal-to-Quebec microwave connection, has leased the facilities to Canadian Pacific Communications and Canadian National Telegraphs, which are under contract to supply CBC with television transmission facilities from Montreal to the Quebec City station, CFCM-TV, officially opened on July 17.

The new microwave link makes available to Quebec City viewers U. S. programs carried over the Bell Telephone's Buffalo-Toronto-Ottawa-Montreal microwave network, as well as programs originating in Montreal and other Canadian points connected to the network.

The latest microwave extension comprises terminal stations in Montreal and Quebec City and five relay points along the south shore of the St. Lawrence River. The relay stations are located near Rougemont, St. Nazaire, Arthabaska, Villeroy and St. Gerard.

Bell engineers began tests to determine the route in the fall of 1952 and construction of the necessary buildings and towers began about a year later. The facilities will also be used in the near future to augment long distance telephone circuits between Montreal and Quebec.

NOW! AMERICA'S QUALITY POLES AVAILABLE FOR Immediate Shipment!
P&H
NORTHERN WHITE CEDAR
PENTA POLES
P & H Northern White Cedar Poles are completely immune against termites and decay. Once treated from top to butt they are protected for life. Once installed they are ready for many years of trouble-free pole-line service. Dependability that helps bring maintenance costs down —yearly profits up!
WATCH FOR THIS BRAND!
'54
P&H
PENTA
Get the complete story TODAY! Write for FREE Pamphlet entitled "Full-Length Treated Northern White Cedar PENTA POLES"
PAGE & HILL, INC.
MINNEAPOLIS 3, MINNESOTA
50 CHURCH STREET • NEW YORK, NEW YORK

IN THE FIELD as in laboratory tests . . . ***Crapo*** Galvanized Steel Strand proves itself capable of withstanding severe punishment. Steel's inherent strength and durability are combined with definite economies in every size and grade of ***Crapo*** Steel Strand. You'll find the heavy, ductile, tightly-bonded zinc coatings, applied by the famous ***Crapo*** Galvanizing Process, provide lasting protection against corrosion.

Contact your jobber of *Crapo* Galvanized Products or write direct for further information!

INDIANA
STEEL & WIRE COMPANY
MUNCIE, INDIANA

L. E. CLAYTON (left) of Automatic Electric's advertising department shows BRUCE QUISENBERRY, assistant publicity director, one of the showcases in a telephone exhibit displayed at the Chicago Public Library during a recent month by Automatic Electric Co. The exhibit, designed and executed jointly by Automatic's product design and advertising departments, was entitled "Yesterday, Today and Tomorrow—Some Historical Developments in Automatic Telephony." Featured in the exhibit were the first dial system to be used in telephony; photographs and examples of the development of automatic telephones from the first one to be installed at La Porte, Ind. (1892), up to the present time, and other items of historical interest. Contrasting with the early developments in automatic telephones and central office switching were examples of the most modern types of equipment. The Chicago Public Library reported the exhibit attracted much favorable attention.

W. V. Kahler of Illinois Bell To Head Captured Sub Ceremony

William V. Kahler, president of the Illinois Bell Telephone Co., on July 24 was named chairman of the dedication committee for the U-505, captured German submarine which will be placed on permanent display at Chicago's Museum of Science and Industry.

Mr. Kahler announced that the dedication will be held the latter part of September. A preview banquet, attended by civic officials, will be held a few days before the dedication.

The submarine is undergoing preparations for the dedication at the American Shipbuilding Co., after which it will be taken to the museum site.

V V

Graybar Names Toledo Manager

E. N. Cundiff has been appointed manager of the Graybar Electric Co. branch at Toledo, O., Cleveland District Manager C. E. Kirkpatrick has announced. He replaces A. W. Hallett who will be assigned special duties in Cleveland.

V V

"Nothing must be allowed to handicap or impede the development of those industries which are esssential to the national security and the national defense."—HENRY B. DU PONT, *vice president, E. I. du Pont de Nemours & Co., Inc.*

Help Wanted

CABLE SPLICERS • LINEMEN
STATION INSTALLERS
STEADY WORK, GOOD PAY.
MIDWEST LOCATION.
The Weikel Line Company, Inc.
FORT WAYNE, IND.